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VAX

PDP-11

Systems and Options Catalogue
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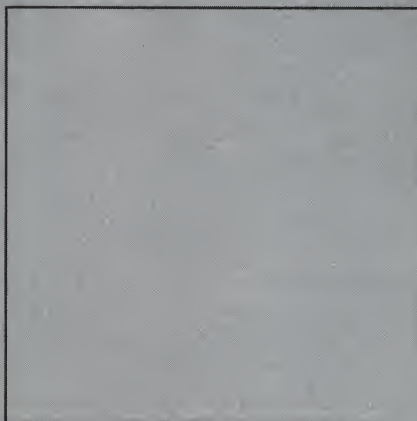
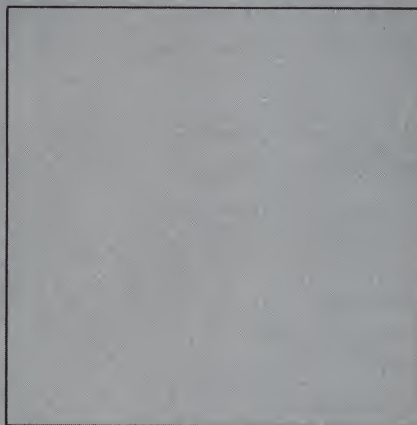
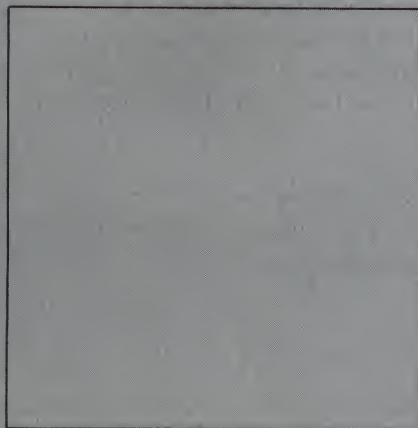
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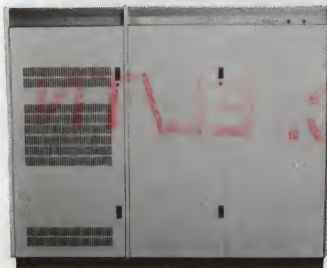
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Introduction

Digital's VAX 8600 computer system is the high-end member of the VAX family of computers. These high-performance systems implement the VAX architecture, making them software compatible with all other VAX systems. The central processor uses 32-bit architecture with 4 gigabytes of virtual addressing space.

The VAX 8600 CPU features virtual memory management, bootstrap loader, standard instructions for packed decimal, floating (F, D, G and H data types) and fixed point arithmetic, character and string manipulations, 16Kbyte write back cache memory, high-precision programmable realtime clock, time-of-year clock with battery backup, and 8K words (86-bit words) of writable control store. Standard with the VAX 8600 is a DF112 modem for remote diagnosis. The CPU also includes a Console Subsystem which comprises an RL02 disk drive, DCT11 microcomputer, console terminal and remote diagnostic port. (Console terminal not included, must be selected from menu.)

The VAX 8600 system is supported by the VMS operating system. VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch and realtime applications.

VAX 8600 VAX System Configuration

The VAX 8600 VAX System Building Block consists of one CPU cabinet and a CPU Front End Cabinet.

CPU Cabinet

The CPU cabinet contains the processor, a memory controller with four Mbytes of ECC MOS memory, one DW780 UNIBUS adapter, one DB86 SBI adapter, and one RB86 controller. Memory can be expanded to 32 Mbytes in the CPU cabinet.

There is dedicated space within the CPU cabinet for one CI780 computer interconnect, one FP86 floating-point accelerator, a second DW780 UNIBUS adapter and a second DB86 SBI Adapter.

CPU Front End Cabinet

The CPU Front End Cabinet contains the console RL02 disk and a BA11 UNIBUS Expansion box.

UNIBUS Expander Box

The UNIBUS Expander Box contains two DD11-DKs and one DD11-CK for a total of five useable system units. One additional system unit is reserved for the RLV12 controller. The BA11-A box is expandable to another UNIBUS cabinet.

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable:

- CPU memory may be expanded to 32 MB with the addition of MS86-BA ECC MOS memory in four Mbyte increments.
- DW780-MB UNIBUS Adapter (one per CPU cabinet, see also SBI expansion).
- DB86 Second SBI Adapter (see SBI Expansion).
- FP86-AA floating-point accelerator (dedicated space, one per system).
- CI780-MA Computer Interconnect (dedicated space, one per system).

UNIBUS Expansion:

For further UNIBUS expansion a DW780-MB, H9652-F, BA11-A and DD11-DK are required (see also SBI Expansion).

SBI Expansion:

Choose one of the following two ways to utilize the SBI expansion capabilities of the VAX 8600.

(1) To extend the included SBI interface, order one H9652-C SBI Expansion cabinet (providing four OPS).

or

(2) Order the optional second SBI adapter (DB86) and up to two H9652-C SBI Expansion cabinets (providing four OPS each).

Up to eight adapters (for a system maximum of eleven) may be connected to this second SBI as follows: up to two CI780 (only one CI780 if a DR780 is also connected), up to four DR780 (only one DR780 if a CI780 is also connected), up to four RH780, and up to four DW780.

Communications

Maximums are dependent on total communications requirements and other considerations. Consult the *VAX/VMS SPD* for details.

- Asynchronous Interfaces—DHU11, DMF32, DMZ32
- Communications Interfaces—DEUNA, DMP11, DMR11, DR11-W, DUP11

Mass Storage

HSC50

- Four TA tapes per HSC5X-CA
- Four RA disks per HSC5X-BA
- Four additional HSC5X disk or tape interfaces (expansion over three interfaces requires second power supply)

UNIBUS

- UDA50 disk controllers, each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other options may be placed on the same UNIBUS with the exception of the DR11-W, PCL11, VS100, VS11, or any other graphic terminal. Adding a second UDA50 requires a second UNIBUS, BA11-K and DD11-DK. With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- RL02 Cartridge Disks (one RL211 subsystem per system)
- TU81 magnetic tape (four subsystems per UNIBUS)

MASSBUS

- On the included SBI a total of four MBAs are allowed, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported MASSBUS devices: REM05 disk subsystems; TEE16, TEU77 and TEU78 tape subsystems.

Input/Output

- System Printers (16 per system, total)
- Terminals, equal to the number of DMZ32, DMF32, and/or DHU11 communication lines (not a system maximum or requirement – see the VAX/VMS SPD for details)
- Terminals connected to Ethernet Terminal Servers (DECSA or LAT-11)

VAX 8600 VAX System Building Blocks**861XA-AJ**

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-MB ECC MOS Memory
- RB86-AA Integrated disk and tape controller
- VMS Operating System License and Warranty



System Device	Load Device
	Disk/Tape (PE = 1600 b/in, GCR = 6250)
	TU81-AB PE/GCR Tape
RA60 205 MB (Removable Disk)	RA60-CD TU81-AB
RA81 456 MB (Fixed Disk)	RA81-AD TU81-AB
RA81 1,368 MB (Fixed Disk)	RA81-ED TU81-AB

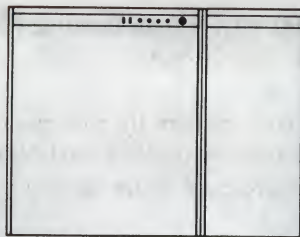
**Communication Device Order Codes**

8-line multipurpose communication interface	DMF32-LD
16-line EIA asynchronous serial communication interface with modem control	DHU11-AD
24-line EIA asynchronous serial communication interface with modem control	DMZ32-AY
24-line EIA asynchronous serial communication interface without modem control	DMZ32-DY
UNIBUS-to-Ethernet controller	DEUNA-AA

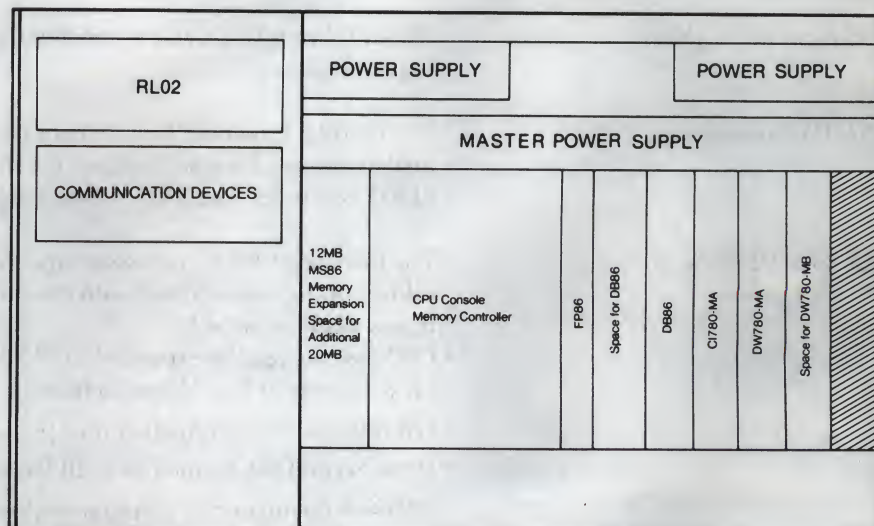
**Console Terminal Order Codes**

Hardcopy Terminal	LA100-BB
Hardcopy Terminal	LA120-DA

VAX 8600 CPU Cabinet
Front End Cabinet



VAX 8600 CPU Cabinet
Front End Cabinet
(Rear View)



**VAX 8600 ULTRIX-32 VAX
System Configuration**

CPU Cabinet

The VAX 8600 VAX System Building Block consists of one CPU cabinet and a CPU Front End Cabinet.

The CPU cabinet contains the processor, a memory controller with four Mbytes of ECC MOS memory, one DW780 UNIBUS adapter, one DB86 SBI adapter, and one RB86 controller. Memory can be expanded to 32 Mbytes in the CPU cabinet.

There is dedicated space within the CPU cabinet for one FP86 floating-point accelerator, a second DW780 UNIBUS adapter and a second DB86 SBI Adapter.

CPU Front End Cabinet

The CPU Front End Cabinet contains the console RL02 disk and a BA11 UNIBUS Expansion box.

UNIBUS Expander Box

The UNIBUS Expander Box contains two DD11-DKs and one DD11-CK for a total of five useable system units. One additional system unit is reserved for the RLV12 controller. The BA11-A box is expandable to another UNIBUS cabinet.

*VAX 8600 ULTRIX-32
Add-On Options*

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable:

- CPU memory may be expanded to 32 MB with the addition of MS86-BA ECC MOS memory in four Mbyte increments.
- DW780-MB UNIBUS Adapter (one per CPU cabinet, see also SBI expansion).
- DB86 Second SBI Adapter (see SBI Expansion).
- FP86-AA floating-point accelerator (dedicated space, one per system).

UNIBUS Expansion:

For further UNIBUS expansion a DW780-MB, H9652-F, BA11-A and DD11-DK are required (see also SBI Expansion).

SBI Expansion:

Choose one of the following two ways to utilize the SBI expansion capabilities of the VAX 8600.

(1) To extend the included SBI interface, order one H9652-C SBI Expansion cabinet (providing four OPS).

or

(2) Order the optional second SBI adapter (DB86) and up to two H9652-C SBI Expansion cabinets (providing four OPS each).

Up to eight adapters (for a system maximum of eleven) may be connected to this second SBI as follows: up to four RH780, or up to four DW780.

Communications

Maximums are dependent on total communications requirements and other considerations. Consult the *VAX/VMS SPD* for details.

- Asynchronous Interfaces – DHU11, DMF32, DMZ32
- Communications Interfaces – DEUNA, DMP11, DMR11, DR11-W, DUP11

UNIBUS Devices:

- UDA50 disk controllers, each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other options may be placed on the same UNIBUS with the exception of the DR11-W, PCL11, VS100, or any other graphic terminal. Adding a second UDA50 requires a second UNIBUS, BA11-K and DD11-DK. With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- RL02 Cartridge Disks (one RL211 subsystem per system)
- TU81 magnetic tape (four subsystems per UNIBUS)

MASSBUS Devices:

- On the included SBI a total of four MBAs are allowed, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported MASSBUS devices: REM05 disk subsystems; TEE16, TEU77 and TEU78 tape subsystems.

Input/Output

- System Printers (16 per system, total)
- Terminals, equal to the number of DMZ32, DMF32, and/or DHU11 communication lines (not a system maximum or requirement. See the *VAX/VMS SPD* for details).
- Terminals connected to Ethernet Terminal Servers (DECSA or LAT-11)

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbyte ECC MOS Memory
- RB86-AA Integrated disk and tape controller
- ULTRIX-32 Operating System License and Warranty



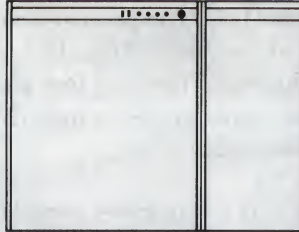
System Device	Load Device Disk/Tape (PE = 1600 b/in, GCR = 6250)
	TU81-AB PE/GCR Tape
RA60 205 MB (Removable Disk)	RA60-CD TU81-AB
RA81 456 MB (Fixed Disk)	RA81-AD TU81-AB
RA81 1,368 MB (Fixed Disk)	RA81-ED TU81-AB



Communication Device Order Codes	8-line multipurpose communication interface	DMF32-LD
	24-line EIA asynchronous serial communication interface with modem control	DMZ32-AY
	24-line EIA asynchronous serial communication interface without modem control	DMZ32-DY
	16-line EIA asynchronous serial communications interface	DHU11-AD
	Ethernet controller	DEUNA-AA

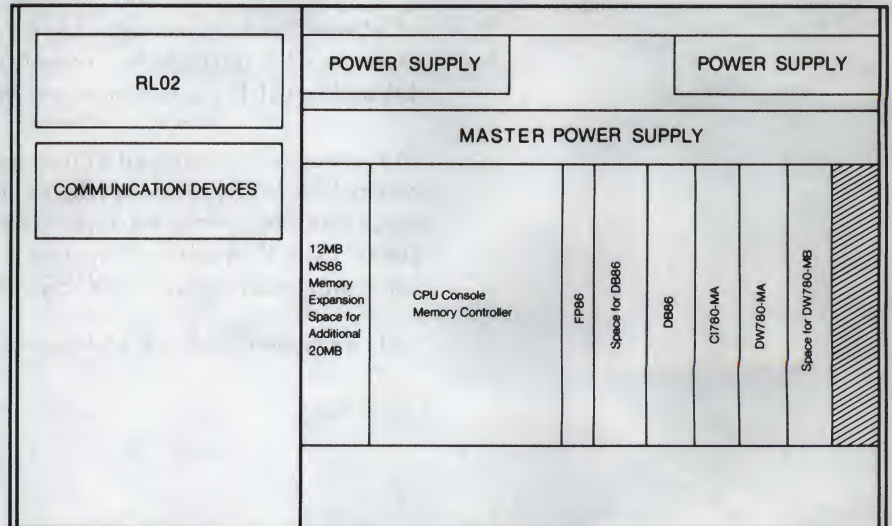


Console Terminal Order Codes	Hardcopy Terminal	LA100-BB
	Hardcopy Terminal	LA120-DA



VAX 8600 CPU Cabinet

Front End Cabinet





Digital's VAX-11/785 computer systems are one of the high-end members of the VAX family of computers. These high-performance systems are based on the VAX family architecture. Therefore, they are software compatible with all other VAX systems. The central processor uses 32-bit architecture with four Gbytes of virtual addressing space.

The VAX-11/785 CPU features virtual memory management; bootstrap loader; standard instructions for packed decimal, floating (G and H data types), and fixed-point arithmetic, character and string manipulations; a 32-Kbyte two-way set-associative cache memory; programmable realtime clock; time-of-year clock with battery backup; and eight 256 Kwords (99-bit words) of writable control store. The CPU also includes a console subsystem comprising an RX01 floppy disk and an LSI-11 microcomputer to which the console terminal is attached.

VAX systems can be ordered with either a VAX/VMS or an ULTRIX-32 operating system. VAX/VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch, and realtime applications. The ULTRIX-32 operating system is a reliable, demand-paged, virtual-memory, timesharing native-mode UNIX* operating system.

*UNIX is a trademark of AT&T Bell Laboratories, Inc.

Configuration

The VAX-11/785 consists of one CPU cabinet and one UNIBUS expansion cabinet.

CPU Cabinet

The CPU cabinet contains a memory controller with at least 2 Mbytes of 64-K chip memory, one DW780 UNIBUS adapter, and two option panel spaces (OPS).

UNIBUS Expansion Cabinet

The UNIBUS expansion cabinet contains one BA11-KV expansion box with a DD11-DK expansion backplane, providing seven hex-slots and two quad-slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11 expansion box or two 26.6-centimeter (10.5-inch) rackmounted options.

There are ten groups of four, 5.6-centimeter wide \times 11.9 centimeter high (2.2-inch wide \times 4.7-inch high) panel units available in the UNIBUS expansion cabinet I/O Connection Panel. Due to cable space limitations, a maximum of 32 of these panel units are available for multiplexed communications lines (DZ11, DMF32, DHU11, and DMZ32). The remaining eight panel units are available for the connector inserts to other options. It provides 40 panel units when configured with either two BA11-Ks or one BA11-K and one 26.7-centimeter (10.5-inch) rackmounted option. Available panel units are reduced to 24 when the cabinet is configured with one BA11-K and two 26.6-centimeter (10.5-inch) rackmounted options. These panel units can be used for any type of option.

VAX-11/785 VAX/VMS Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU Options

- CPU memory can be expanded to 16 Mbytes with the addition of MS780-F ECC MOS (64-K chip) memory. Additional memory can be added in a CPU Expansion Cabinet (H9652-H). An additional 16 Mbytes of MS780-E ECC MOS (64K-chip) memory can be added for a total of 32 Mbytes. Or an additional 48 Mbytes of MS780-H ECC MOS (256K-chip) memory can be added in eight-Mbyte increments for a total of 64 Mbytes. 256K-chip and 64K-chip memory cannot be shared on the same controller.
- H7112 memory battery backup (dedicated space in cabinet, one per memory controller).
- MA780 multiport memory controllers (two per system).
- FP785 floating-point accelerator (dedicated space, one per system).
- DW780 UNIBUS adapter (four per system total).
- DR780 general purpose interface or CI780 interface (one per system).
- Remote diagnosis feature with Field Service contract.

Communications

- Maximums are dependent on total communications requirements and other considerations. Consult the *VAX/VMS SPD* for details.
- DEUNA, DMP11, DMR11, and DUP11 Communications Interfaces.

Mass Storage

UNIBUS

- UDA50 disk controllers, each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other options can be placed on the same UNIBUS with the exception of the DR11-W, PCL11, or any other graphic terminal. Adding a second UDA50 requires a second UNIBUS, BA11-K, and DD11-DK. With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- RL02 cartridge disks (one RL211 subsystem per system, or four drives).
- TU80 magnetic tape (one subsystem per UNIBUS).
- TU81 magnetic tape (one subsystem per UNIBUS).
- RUC25 (one per system).

MASSBUS

- A total of four MBAs, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported VAX-11/785 MASSBUS devices: REM05 and REP07 disk subsystems; TEE16, TEU77, and TEU78 tape subsystems. See MASSBUS Adapters description.

Input/Output

- System printers (16 per system, total).
- Terminals, equal to the number of DMF32, DZ32, DHU11, DMZ32, and/or DZ11 communication lines (not a system maximum or requirement. See the VAX/VMS SPD for details).

Expansion Cabinets

- H9652-MH UNIBUS expansion cabinet.
- H9652-HB CPU expansion cabinet.

A fully supported system requires a system device, load device, communications device and console terminal. If your order does not include the appropriate devices, it may not be maintainable. In this case, you should contact your local Field Service branch office.

- 2-Mbyte ECC MOS (64-K chip) memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- VAX/VMS license and warranty



Mass Storage Order Codes

System Device	Load Device NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in			
	RA60 205 MB Removable Disk	TU80 PE Tape	TU81 PE/GCR Tape	TU78 PE/GCR Tape
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TU81-AB	RUA60-CD TEU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-AD TU81-AB	RUA81-CD TEU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TU81-AB	RUA81-ED TEU78-FD



Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-Aÿ
24-line asynchronous multiplexer without modem control	DMZ32-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/ language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

Software and Service Order Codes†

VAX/VMS H-kit media and documentation	QE001-H‡
VAX/VMS OSSP 1	QE001-5‡
VAX/VMS OSSP 2	QE001-7‡
VAX/VMS OSSP 3	QE001-B‡

†Media and documentation (H-kit) is required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

Configuration	The VAX-11/785 consists of one CPU cabinet and one UNIBUS expansion cabinet.
<i>CPU Cabinet</i>	The CPU cabinet contains a memory controller with 2 Mbytes of 64-K chip memory, one DW780 UNIBUS adapter, and two option panel spaces (OPS).
<i>UNIBUS Expansion Cabinet</i>	<p>The UNIBUS expansion cabinet contains one BA11-KV expansion box with a DD11-DK expansion backplane, providing seven hex-slots and two quad-slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11 expansion box or two 26.6-centimeter (10.5-inch) rackmounted options.</p> <p>There are ten groups of four, 5.6-centimeter wide × 11.9 centimeter high (2.2-inch wide × 4.7-inch high) panel units available in the UNIBUS expansion cabinet I/O Connection Panel. Due to cable space limitations, a maximum of 32 of these panel units is available for multiplexed communications lines (DZ11, DMF32, DHU11, and DMZ32). The remaining eight panel units are available for the connector inserts to other options. It provides 40 panel units when configured with either two BA11-Ks or one BA11-K and one 26.7-centimeter (10.5-inch) rackmounted option. Available panel units are reduced to 24 when the cabinet is configured with one BA11-K and two 26.6 centimeter (10.5-inch) rackmounted options. These panel units can be used for any type of option.</p>
VAX-11/785 ULTRIX-32 Add-On Options	The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.
<i>CPU Options</i>	<ul style="list-style-type: none"> ▪ CPU memory can be expanded to 8 Mbytes with the addition of MS780-F ECC MOS (64-K chip) memory. An additional 16 Mbytes of MS780-E ECC MOS (64-K chip) expansion memory can be added in a CPU expander cabinet (H9652-H). ▪ FP785 floating-point accelerator (dedicated space, one per system). ▪ DW780 UNIBUS adapter (four per system total). ▪ Remote diagnosis feature with Field Service contract.
<i>Communications*</i>	<ul style="list-style-type: none"> ▪ Maximums are dependent on total communications requirements and other considerations. Consult ULTRIX-32 SPD for details. ▪ Asynchronous interfaces: DZ11, (not to exceed 96 lines per system) and/or DMF32, DHU11, DMZ32 (not to exceed 64 lines per system) – up to a total of 96 lines per system. ▪ DEUNA and DMR11 communications interfaces.

*Please refer to the ULTRIX-32 software descriptions in this catalog for details on login user limit size.

Mass Storage

UNIBUS

- UDA50 disk controllers, up to two per system each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other supported options may be placed on the same UNIBUS. Adding a second UDA50 requires a second UNIBUS, BA11-K, and DD11-DK.
- RL02 cartridge disks (one RL211 subsystem per system, or four drives).
- TU80 magnetic tape (four subsystems per system). Up to four tape drives total per system including MASSBUS and UNIBUS.
- TU81 magnetic tape

MASSBUS

- A total of four MBAs, each requiring one OPS.
- A total of eight MASSBUS disks per system. Supported VAX-11/785 MASSBUS devices: REM05 and REP07 disk subsystems.
- As many as four MASSBUS tape drives per system. Supported VAX-11/785 MASSBUS tapes: TEE16, TEU77, and TEU78 tape subsystems. See MASSBUS Adapters description. Up to four tape drives total per system including MASSBUS and UNIBUS.

Input/Output

- System lineprinters (two per system, total).
- Terminals—see ULTRIX-32 SPD for details.

Expansion Cabinets

- H9652-MH UNIBUS expansion cabinet.
- H9652-HB CPU expansion cabinet.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- ULTRIX-32 1-to-32-user license only, capacity upgrade options required beyond 32 users.

Mass Storage Order Codes

System Device	Load Device NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in			
	RA60 205 MB Removable Disk	TU80 PE Tape	TU77 NRZI/PE Tape	TU78 PE/GCR Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB	RUA80-CD TEU77-FD	RUA80-CD TEU78-FD
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TEU77-FD	RUA60-CD TEU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-CD TEU77-FD	RUA81-CD TEU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TEU77-FD	RUA81-ED TEU78-FD

*Only the asynchronous lines on the DMF32 are supported.

Communication Device Order Codes

Multipurpose communications interface	DMF32-LD*
8-line EIA asynchronous serial communications interface	DZ11-DD
Ethernet/UNIBUS controller	DEUNA-AA

Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

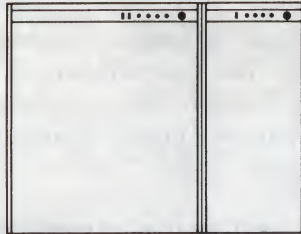
Software and Service Order Codes†

ULTRIX-32 H-kit media and documentation	QE821-H‡
ULTRIX-32 OSSP 1	QE821-5‡
ULTRIX-32 OSSP 2	QE821-7‡
ULTRIX-32 OSSP 3	QE821-B‡

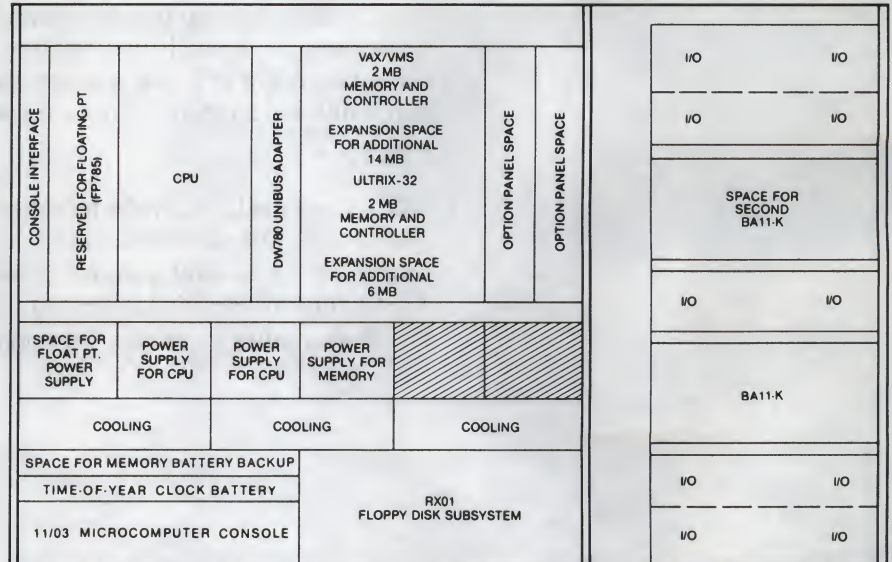
†Media and documentation (H-kit) is required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Start-up Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

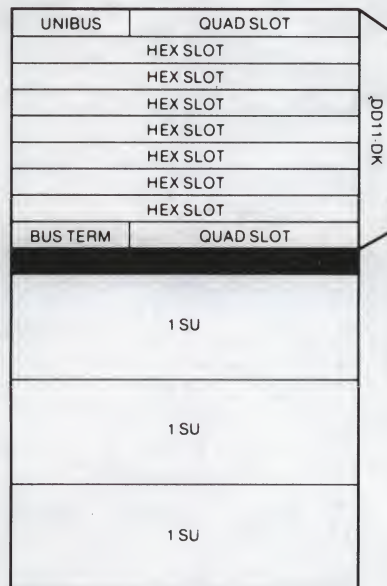
VAX-11/785 CPU Cabinet
Unibus Expansion Cabinet



VAX-11/785 CPU Cabinet
Unibus Expansion Cabinet
(Front Panel Removed)

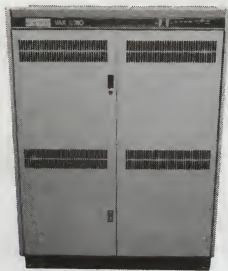


BA11-KU(KV) Expansion Mounting
Box with DD11-DK Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
BA11-K Box		4.0	10.0	19.0
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0			
SU 3-5: 3 SUs	32.0			



Digital's VAX-11/780 computer systems are high-end members of the VAX family of computers. These high-performance systems are based on the VAX family architecture. Therefore, they are software compatible with all other VAX systems. The central processor uses 32-bit architecture with four Gbytes of virtual addressing space.

The VAX-11/785 CPU features virtual memory management; bootstrap loader; standard instructions for packed decimal, floating (G and H data types), and fixed-point arithmetic, character and string manipulations; 8 Kbytes of bipolar cache memory with parity; a high-precision programmable realtime clock; a time-of-year clock with battery backup; and 2 Kwords (99-bit words) of writable control store. The CPU also includes a console subsystem comprising an RX01 floppy disk and an LSI-11 microcomputer to which the console terminal is attached.

VAX systems can be ordered with either a VAX/VMS or an ULTRIX-32 operating system. VAX/VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch, and realtime applications. The ULTRIX-32 operating system is a reliable, demand-paged, virtual-memory, timesharing native-mode UNIX operating system.

Configuration

The VAX-11/780 consists of one CPU cabinet and one UNIBUS expansion cabinet.

CPU Cabinet

The CPU cabinet contains a memory controller with two Mbytes of 64-K chip memory or 16 Mbytes of 256-K chip memory, one DW780 UNIBUS adapter, and two option panel spaces (OPS).

UNIBUS Expansion Cabinet

The UNIBUS expansion cabinet contains one BA11-KV expansion box with a DD11-DK expansion backplane, providing seven hex-slot and two quad-slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11 expansion box or two 26.6-centimeter (10.5-inch) rackmounted options.

There are ten groups of four, 5.6-centimeter wide \times 11.9 centimeter high (2.2-inch wide \times 4.7-inch high) panel units available in the UNIBUS expansion cabinet I/O Connection Panel. Due to cable space limitations, a maximum of 32 of these panel units is available for multiplexed communications lines (DZ11, DMF32, DHU11, and DMZ32). The remaining eight panel units are available for the connector inserts to other options. It provides 40 panel units when configured with either two BA11-K's or one BA11-K and one 26.7-centimeter (10.5-inch) rackmounted option. Available panel units are reduced to 24 when the cabinet is configured with one BA11-K and two 26.6 centimeter (10.5-inch) rackmounted options. These panel units can be used for any type of option.

VAX-11/780 VAX/VMS Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU Options

- CPU memory can be expanded to 16 Mbytes with the addition of MS780-F ECC MOS (64-K chip) memory. An additional 16 Mbytes of MS780-E ECC MOS (64-K chip) expansion memory can be added in a CPU expander cabinet (H9652-H).
- When using the MS780-H ECC MOS (256-K chip) memory, the CPU memory can be expanded to a maximum of 64 Mbytes. No expander cabinet or second controller is required. MS780-H memory must be added in 8-Mbyte increments. 256-K chip memory and 64-K chip memory cannot be shared on the same controller.
- H7112 memory battery backup (dedicated space in cabinet, one per memory controller).
- MA780 multiport memory controllers (two per system).
- FP780 floating-point accelerator (dedicated space, one per system).
- KU780 user writable control store (dedicated space).
- DW780 UNIBUS adapter or MASSBUS adapter (four per system total).
- DR780 general purpose interface (one per system).
- CI780 interface (one per system).
- KE780 G floating-point and H floating-point microcode.
- Remote diagnosis feature with Field Service contract.

Communications

- Maximums are dependent on total communications requirements and other considerations. Consult the *VAX/VMS SPD* for details.
- Asynchronous interfaces: DZ11, DHU11,* DMZ32 (not to exceed 96 lines per UNIBUS), and/or DMF32 (not to exceed 80 lines per UNIBUS).
- DEUNA, DMP11, DMR11, and DUP11 communications interfaces.

*Requires VMS version 4.0.

Mass Storage

UNIBUS

- UDA50 disk controllers, each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other options may be placed on the same UNIBUS with the exception of the DR11-W, PCL11, VS100, VS11, or any other graphic terminal. Adding a second UDA50 requires a second UNIBUS, BA11-K and DD11-DK. With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- RL02 cartridge disks (one RL211 subsystem per system, or four drives).
- TU80 magnetic tape (one subsystem per UNIBUS).
- TU81 magnetic tape (one subsystems per UNIBUS).
- RUC25 (one per system).

MASSBUS

- A total of four MBAs, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported VAX-11/780 MASSBUS devices: REM05 and REP07 disk subsystems; TEE16, TEU77, and TEU78 tape subsystems. See MASSBUS Adapters description.

Input/Output

- System printers (16 per system, total).
- Terminals, equal to the number of DMF32, DZ32, DHU11, DMZ32, and/or DZ11 communication lines (not a system maximum or requirement. See the *VAX/VMS SPD* for details).

Expansion Cabinets

- H9652-MH UNIBUS expansion cabinet.
- H9652-HB CPU expansion cabinet.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS (64-K chip) memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- VAX/VMS license and warranty

Mass Storage Order Codes

System Device	Load Device NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in			
	RA60 205 MB Removable Disk	TU80 PE Tape	TU81 PE/GCR Tape	TU78 PE/GCR Tape
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TU81-AB	RUA60-CD TEU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-AD TU81-AB	RUA81-CD TEU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TU81-AB	RUA81-ED TEU78-FD

Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DMZ32-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/ language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		



Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA



Software and Service Order Codes†

VAX/VMS H-kit media and documentation	QE001-H‡
VAX/VMS OSSP 1	QE001-5‡
VAX/VMS OSSP 2	QE001-7‡
VAX/VMS OSSP 3	QE001-B‡

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

Configuration

The VAX-11/780 consists of one CPU cabinet and one UNIBUS expansion cabinet.

CPU Cabinet

The CPU cabinet contains a memory controller with two Mbytes of 64-K chip memory, one DW780 UNIBUS adapter, and two option panel spaces (OPS).

UNIBUS Expansion Cabinet

The UNIBUS expansion cabinet contains one BA11-KV expansion box with a DD11-DK expansion backplane, providing seven hex-slots and two quad-slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11 expansion box or two 26.6-centimeter (10.5-inch) rackmounted options.

There are ten groups of four, 5.6-centimeter wide \times 11.9 centimeter high (2.2-inch wide \times 4.7-inch high) panel units available in the UNIBUS expansion cabinet I/O Connection Panel. Due to cable space limitations, a maximum of 32 of these panel units is available for multiplexed communications lines (DZ11, DMF32, DHU11, and DMZ32). The remaining eight panel units are available for the connector inserts to other options. It provides 40 panel units when configured with either two BA11-K's or one BA11-K and one 26.7-centimeter (10.5-inch) rackmounted option. Available panel units are reduced to 24 when the cabinet is configured with one BA11-K and two 26.6 centimeter (10.5-inch) rackmounted options. These panel units can be used for any type of option.

**VAX-11/780 ULTRIX-32
Add-On Options**

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU Options

- CPU memory can be expanded to a system maximum of 8 Mbytes with the addition of MS780-F ECC MOS (64-K chip) memory.
- FP780 floating-point accelerator (dedicated space, one per system).
- DW780 UNIBUS adapter or MASSBUS adapter (four per system total).
- Remote diagnosis feature with Field Service contract.

Communications†

- Maximums are dependent on total communications requirements and other considerations. Consult ULTRIX-32 SPD for details.
- Asynchronous interfaces: DZ11, (not to exceed 96 lines per system) and/or DMF32,‡ DHU11, DMZ32 (not to exceed 64 lines per system) – up to a total of 96 lines per system.
- DEUNA and DMR11 communications interfaces.

†Please refer to the ULTRIX-32 software description in this catalog for details on login user limit size.

‡Only the asynchronous lines of the DMF32 are supported.

Mass Storage

UNIBUS

- UDA50 disk controllers, up to two per system each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other supported options can be placed on the same UNIBUS. Adding a second UDA50 requires a second UNIBUS, BA11-K, and DD11-DK.
- RL02 cartridge disks (one RL211 subsystem per system, or four drives).
- TU80 magnetic tape (four subsystems per system). Up to four tape drives total per system including MASSBUS and UNIBUS.

MASSBUS

- A total of four MBAs, each requiring one OPS.
- A total of eight MASSBUS disks per system. Supported VAX-11/780 MASSBUS devices: REM05 and REP07 disk subsystems.
- Up to four MASSBUS tape drives per system. Supported VAX-11/780 MASSBUS tapes: TEE16, TEU77, and TEU78 tape subsystems. See MASSBUS Adapters description. Up to four tape drives total per system including MASSBUS and UNIBUS.

Input/Output

- LP11 lineprinters (two per system, total).
- Terminals—see ULTRIX-32 SPD for details.

Expansion Cabinets

- H9652-MH UNIBUS expansion cabinet.
- H9652-HB CPU expansion cabinet.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- ULTRIX-32 1-to-32-user license only, capacity upgrade options required beyond 32 users.

Mass Storage Order Codes

Load Device

NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in

System Device	RA60 205 MB Removable Disk	TU80 PE Tape	TU77 NRZI/PE Tape	TU78 PE/GCR Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB	RUA80-CD TEU77-FD	RUA80-CD TEU78-FD
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TEU77-FD	RUA60-CD TEU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-CD TEU77-FD	RUA81-CD TEU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TEU77-FD	RUA81-ED TEU78-FD

Communication Device Order Codes

Multipurpose communications interface	DMF32-LD*
8-line EIA asynchronous serial communications interface	DZ11-DD
Ethernet/UNIBUS controller	DEUNA-AA

*Only the asynchronous lines on the DMF32 are supported.

Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

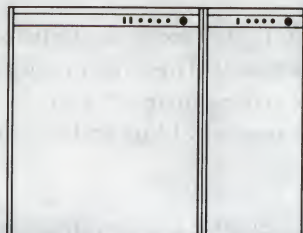
Software and Service Order Codes†

ULTRIX-32 H-kit media and documentation	QE821-H‡
ULTRIX-32 OSSP 1	QE821-5‡
ULTRIX-32 OSSP 2	QE821-7‡
ULTRIX-32 OSSP 3	QE821-B‡

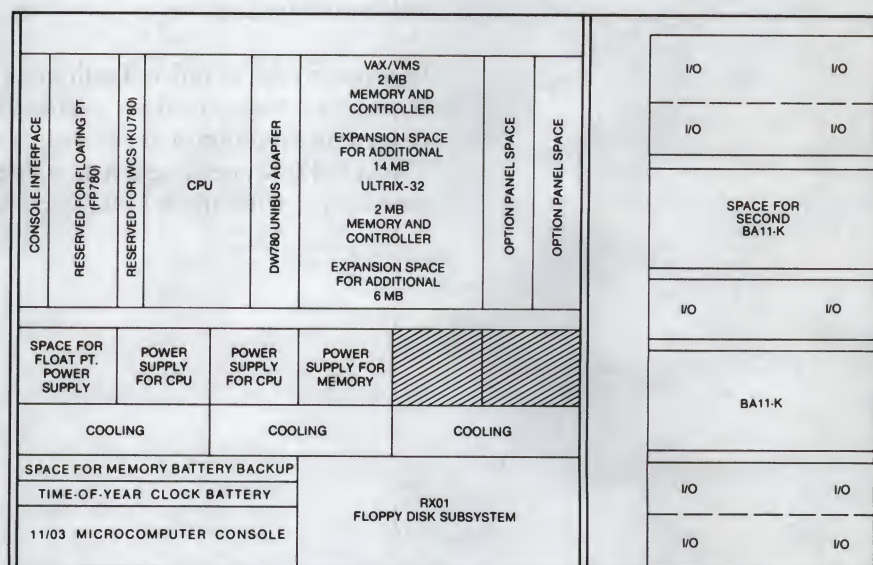
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

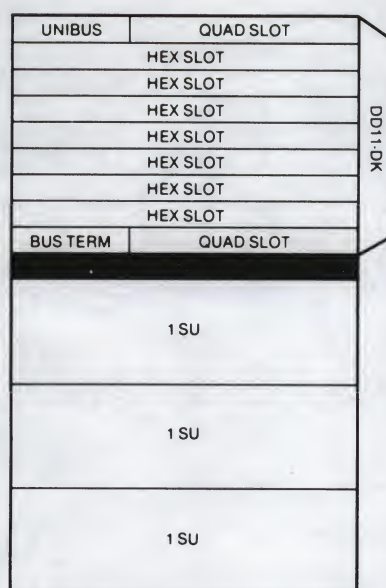
VAX-11/780 CPU Cabinet
UNIBUS Expansion Cabinet



VAX-11/780 Cabinet
Unibus Expansion Cabinet
(Front Panel Removed)

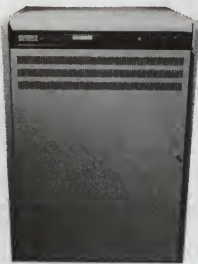


BA11-KV Expansion Mounting Box with DD11-DK Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
BA11-K Box		4.0	10.0	19.0
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0			
SU 3-5: 3 SUs	32.0			



Digital's VAX-11/750 computer systems are the midrange members of the VAX family of computers. These high-performance systems implement the VAX family architecture, making them software-compatible with all other VAX systems. The central processor uses 32-bit architecture with 4 Gbytes of virtual addressing space.

The VAX-11/750 CPU features virtual memory management, bootstrap loader, standard instructions for floating- and fixed-point arithmetic, 4 Kbytes of bipolar cache memory with parity; programmable realtime clock, and time-of-year clock with battery backup.

VAX systems can be ordered with either a VAX/VMS or an ULTRIX-32 operating system. VAX/VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch, and realtime applications. The ULTRIX-32 operating system is a demand-paged, virtual-memory, timesharing, native-mode UNIX operating system.

Configuration

The CPU cabinet contains the CPU backplane and a UNIBUS expansion backplane. The VAX-11/750 CPU backplane has dedicated slots for CPU options and additional memory, and three general purpose I/O adapter slots (I/O slot). The UNIBUS expansion backplane provides seven hex-slots and two quad-slots for mounting menu selections and additional UNIBUS options.

There are three groups of four panel unit spaces and one group of three panel unit spaces available in the I/O connection panel for panel inserts.

UNIBUS Expansion

UNIBUS devices mount in the available space in the DD11 UNIBUS expansion backplane included with the system. For UNIBUS expansion beyond the DD11 and/or for use with the DW750, additional backplane space is required, and an H9642 general purpose UNIBUS expansion cabinet, a BA11-KV expansion box, and a DD11-CK or -DK expansion backplane must be ordered.

**VAX-11/750 VAX/VMS
Add-On Options**

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Memory- Up to 6 Mbytes of MS750 (64-K chip) memory can be added to reach system total of 8 Mbytes (eight boards).
- FP750 floating-point accelerator (one per system).
- KU750 extended range G floating-point and H floating-point data type option.
- H7112 memory battery backup (one per system).
- L0006 remote diagnosis with Field Service contract.
- DW750 second UNIBUS adapter (one per system).
- DR750 general purpose interface (one per system).*
- CI750 computer interconnect (one per system).*

*The DR750 and the CI750 cannot both be present.

Communications

- Maximums are dependent on total communications requirements and other considerations. Consult the VAX/VMS SPD for details.
- Asynchronous interfaces: DZ11, DHU11, DMZ32, (not to exceed 64 lines per UNIBUS), and DMF32 (not to exceed 64 lines per system).
- DEUNA, DMP11, DMR11, and DUP11 communications interfaces.

Mass Storage

UNIBUS

- UDA50 disk controller supporting up to four of any combination of RA60, RA80, or RA81 drives. ONE UDA50 is allowed and supported on the *first* UNIBUS. Other options can be placed on the same UNIBUS with the exception of the DR11-W, PCL11, VS11, or any other graphic terminal. Adding a second UDA50 to the system requires a second UNIBUS (DW750), BA11-K expander box, DD11-DK expansion backplane, and an expander cabinet (H9642-F). With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- TU80 magnetic tape (two subsystems per system).
- TU81 magnetic tape (two subsystems per system).
- RL02 cartridge disks (one RL211 subsystem per system, up to four drives).
- RUC25 (one per system).

MASSBUS

- A total of three MBAs.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. VAX-11/750 MASSBUS supported devices: RGM05 and RGP07 disk subsystems, TGE16, TGU77, and TGU78 tape subsystems. See MASSBUS Adapters description. *Note:* The RP07 is supported as a data disk only, not as a system disk.

Input/Output

- System printers (four per system, total).
- Terminals, equal to number of DMF32, DHU11, DMZ32, and/or DZ11 communication lines (not a system maximum or requirement. See the *VAX/VMS SPD* for details).

Expansion Cabinets

- H9642-F general purpose expansion cabinet.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS (64-K chip) memory
- VAX/VMS license and warranty
- DD11-DK nine-slot UNIBUS backplane



Mass Storage Order Codes

Load Device

NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in

System Device	RA60 205 MB Removable Disk	TU80 PE Tape	TU81 PE/GCR Tape	TU78 PE/GCR Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB	RUA80-AD TU81-AB	RUA80-CD TGU78-FD
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD RU80-AB	RUA60-CD TU81-AB	RUA60-CD TGU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-AD TU81-AB	RUA81-CD TGU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TU81-AB	RUA81-ED TGU78-FD



Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LE
16-line asynchronous multiplexer	DHU11-AE
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DMZ32-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		



Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA
Hardcopy terminal	LA12-DB



Software and Service Order Codes†

VAX/VMS H-kit media and documentation	QD001-H‡
VAX/VMS OSSP 1	QD001-5‡
VAX/VMS OSSP 2	QD001-7‡
VAX/VMS OSSP 3	QD001-B‡

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

Configuration

The CPU cabinet contains the CPU backplane and a UNIBUS expansion backplane. The VAX-11/750 CPU backplane has dedicated slots for CPU options and additional memory and three general purpose I/O adapter slots (I/O slot). The UNIBUS expansion backplane provides seven hex-slots and two quad-slots for mounting menu selections and additional UNIBUS options.

There are three groups of four panel unit spaces and one group of three panel unit spaces available in the I/O connection panel for panel inserts.

UNIBUS Expansion

UNIBUS devices mount in the available space in the DD11 UNIBUS expansion backplane included with the system. For UNIBUS expansion beyond the DD11, additional backplane space is required, and an H9642 general purpose UNIBUS expansion cabinet, a BA11-KV expansion box, and a DD11-CK or -DK expansion backplane must be ordered.

**VAX-11/750 ULTRIX-32
Add-On Options**

The following CPU, communications, mass storage, input/output, and expansion cabinetry options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Memory- Up to 6 Mbytes of MS750 (64-K chip) memory can be added to reach system total of 8 Mbytes (eight boards).
- FP750 floating-point accelerator (one per system).
- L0006 Remote diagnosis with Field Service contract.

Communications†

- Maximums are dependent on total communications requirements and other considerations. Consult the *ULTRIX-32 SPD* for details.
- Asynchronous interfaces: DZ11, DHU11, DMZ32, and DMF32s‡ – in any combination, to a maximum of 64 lines per system.
- DEUNA and DMR11 communications interfaces.

†Please refer to the ULTRIX-32 software description in this catalog for details on login user limit size.

‡Only the asynchronous lines of the DMF32 are supported.

Mass Storage

UNIBUS

- UDA50 disk controllers, up to two per system each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other supported options can be placed on the same UNIBUS. Adding a second UDA50 requires a second UNIBUS, BA11-K, and DD11-DK.
- TU80 magnetic tape (two subsystems per system).
- RL02 cartridge disks (one RL211 subsystem per system, up to four drives).

MASSBUS

- A total of three MBAs.
- A total of eight MASSBUS disks per system. Supported VAX-11/750 MASSBUS devices: RGM05 and RGP07 disk subsystems. *Note:* The RP07 is supported as a data disk only, not as a system disk.
- Up to four MASSBUS tape drives per system. Supported VAX-11/750 MASSBUS tapes: TGE16, TGU77, TGU78 tape subsystems. See MASSBUS Adapter description. Up to four tape drives total per system including MASSBUS and UNIBUS.

Input/Output

- System lineprinters (two per system, total).
- Terminals—see *ULTRIX-32 SPD* for details.

Expansion Cabinets

- H9642-F general purpose expansion cabinet.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS (64-K chip) memory
- DD11-DK nine-slot UNIBUS backplane • ULTRIX-32 1-to-32-user license only, Capacity upgrade options required beyond 32 users.

Mass Storage Order Codes

System Device	Load Device NRZI = 800 b/in, PE = 1600 b/in, GCR = 6250 b/in			
	RA60 205 MB Removable Disk	TU80 PE Tape	TU77 PE/NRZI Tape	TU78 PE/GCR Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB	RUA80-CD TGU77-FD	RUA80-CD TGU78-FD
RA80 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TGU77-FD	RUA60-CD TGU78-FD
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-CD TGU77-FD	RUA81-CD TGU78-FD
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TGU77-FD	RUA81-ED TGU78-FD

Communication Device Order Codes

Multipurpose communications interface	DMF32-LE*
8-line EIA asynchronous serial communications interface	DZ11-DE
Ethernet/UNIBUS controller	DEUNA-AA

*Only the asynchronous lines on the DMF32 are supported.

Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA
Hardcopy terminal	LA12-DB

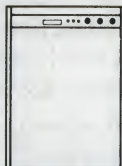
Software and Service Order Codes†

ULTRIX-32 H-kit media and documentation	QD821-H‡
ULTRIX-32 OSSP 1	QD821-5‡
ULTRIX-32 OSSP 2	QD821-7‡
ULTRIX-32 OSSP 3	QD821-B‡

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

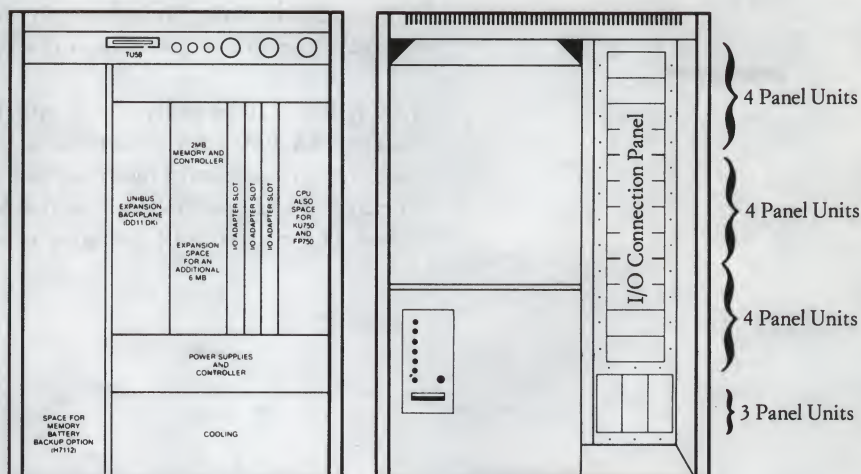
‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

VAX-11/750

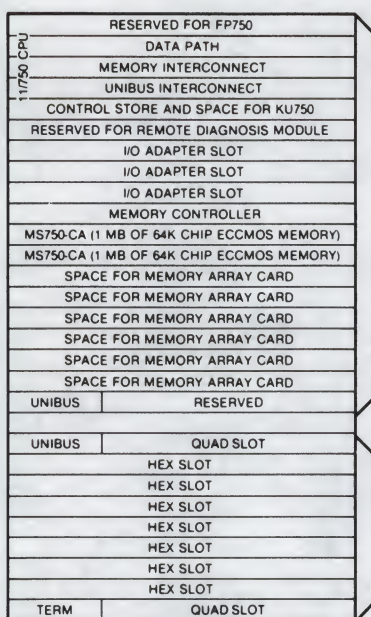


VAX-11/750 CPU Cabinet

VAX-11/750 CPU Cabinet (Rear View)

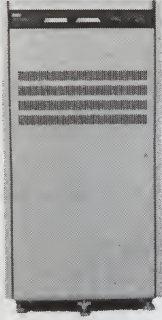


VAX-11/750 CPU Cabinet System Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
DD11-DK UNIBUS	32.0	2.0	3.5	19.0
Expansion Backplane: 7 Hex slots, 2 Quad slots				



The VAX-11/730 System Building Block contains the VAX-11/730 CPU, one member of the low-end VAX family of computers. These systems implement the VAX family architecture, making them software-compatible with all other VAX systems. The CPU uses 32-bit architecture with 4-Gbytes of virtual addressing space.

The VAX-11/730 CPU features virtual memory management; integral floating-point, packed-decimal and character-string instructions, bootstrap loader; an interval timer; and a time-of-year clock.

VAX systems can be ordered with either a VAX/VMS or an ULTRIX-32 operating system. VAX/VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch, and realtime applications. The ULTRIX-32 operating system is a demand-paged, virtual-memory, timesharing native UNIX operating system.

Configuration

The CPU cabinet contains a CPU box with two standard backplanes. One is the system backplane with dedicated slots for CPU and I/O options and additional memory. The second is the DD11 UNIBUS expansion backplane that provides seven hex-slots and two quad-slots for mounting menu selections and additional UNIBUS options.

There are 20 panel unit spaces available in the I/O connection panel for panel inserts.

VAX/VMS Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinetry options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Memory – One MS730 (64-K chip) memory module can be added to reach system total of three Mbytes.
- FP730 floating-point accelerator (one).
- H7750 battery backup.

Communications

- Maximums are dependent on total communications requirements and other considerations. Consult VAX/VMS SPD for details.
- Asynchronous interfaces: DZ11, DHU11, DMZ32, or DMF32 asynchronous communications interfaces, in any combination. *Note:* Not to exceed 24 asynchronous lines per system.
- DEUNA, DMP11, DMR11, or DUP11 communications interfaces.

Mass Storage

- One UDA50 disk controller per system supporting up to four of any combination of RA60, RA80, and RA81 drives.
- RL02 cartridge disks (one RL211 subsystem per system, up to four drives).
- RUC25 disk controller (one per system).
- TU80 magnetic tape controller (one).
- TU81 magnetic tape controller (one).

Input/Output

- System printers (one per system total) —see *VAX/VMS SPD* for details.
- Terminals, equal to the number of DMF32, DZ32, DHU11, DMZ32, and/or DZ11 communication lines (not a system maximum or requirement. See the *VAX/VMS SPD* for details).

Expansion Cabinets

- For UNIBUS expansion an H9642-FB or FD general purpose UNIBUS expansion cabinet plus a BA11-K expander box and a DD11 expansion backplane must be ordered.

UNIBUS Expansion

UNIBUS devices mount in the available space in the DD11 UNIBUS expansion backplane.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS memory
- DD11-DK 9-slot UNIBUS backplane
- VAX/VMS license and warranty

Mass Storage Order Codes

Load Device

PE = 1600 b/in, GCR = 6250 b/in

System Device	RA60 205 MB Removable Disk	TU80 PE Tape	TU81 PE/GCR Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB	RUA80-AD TU81-AB
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB	RUA60-CD TU81-AB
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB	RUA81-AD TU81-AB
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB	RUA81-ED TU81-AB

Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LE
16-line asynchronous multiplexer	DHU11-AE
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DMZ32-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		



Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA12-DB
Hardcopy terminal	LA120-DA



Software and Service Order Codes†

VAX/VMS H-kit media and documentation	QC001-H‡
VAX/VMS OSSP 1	QC001-5‡
VAX/VMS OSSP 2	QC001-7‡
VAX/VMS OSSP 3	QC001-B‡

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

Configuration

The CPU cabinet contains a CPU box with two standard backplanes. One is the system backplane with dedicated slots for CPU and I/O options and additional memory. The second is the DD11 UNIBUS expansion backplane that provides seven hex-slots and two quad-slots for mounting menu selections and additional UNIBUS options.

There are 20 panel unit spaces available in the I/O connection panel for panel inserts.

ULTRIX-32 Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Memory—One MS730 (64-K chip) memory module can be added to reach system total of 3 Mbytes.
- FP730 floating-point accelerator (one).
- TU80 magnetic tape controller (one).
- LP11 printer controller (one).

Communications†

- Maximums are dependent on total communications requirements and other considerations. Consult ULTRIX-32 SPD for details.
- Asynchronous interfaces: DZ11, DMF32,‡ or DHU11 asynchronous communications interfaces, in any combination. *Note:* Not to exceed 16 asynchronous lines per system.
- DEUNA and DMR11 communications interfaces.

†Please refer to the ULTRIX-32 software description in this catalog for details on login user limit size.

‡Only the asynchronous lines of the DMF32 are supported.

Mass Storage

- One UDA50 disk controller per system supporting up to four of any combination of RA60, RA80, and RA81 drives.
- RL02 cartridge disks (one RL211 subsystem per system, up to four drives).

Input/Output

- Terminals—see the *ULTRIX-32 SPD* for details.

Expansion Cabinet

- For UNIBUS expansion an H9642-FB or -FD general purpose UNIBUS expansion cabinet plus a BA11-KV expander box and a DD11 expansion backplane must be ordered.

UNIBUS Expansion

UNIBUS devices mount in the available space in the DD11 UNIBUS expansion backplane.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 2-Mbyte ECC MOS (64-K chip) memory
- DD11-DK 9-slot UNIBUS backplane
- ULTRIX-32 (16-user) license



Mass Storage Order Codes

Load Device
PE = 1600 b/in

System Device	RA60 205 MB Removable Disk	TU80 PE Tape
RA80 121 MB Fixed Disk	RUA80-AD RA60-CD	RUA80-AD TU80-AB
RA60 205 MB Removable Disk	RUA60-CD RA60-AA	RUA60-CD TU80-AB
RA81 456 MB Fixed Disk	RUA81-AD RA60-CD	RUA81-AD TU80-AB
RA81 1,368 MB 3-Fixed Disks	RUA81-ED RA60-CD	RUA81-ED TU80-AB



Communication Device Order Codes

Multipurpose communications interface	DMF32-LE
Ethernet/UNIBUS controller	DEUNA-AA
8-line EIA asynchronous serial communications interface	DZ11-DE



Print Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA12-DB
Hardcopy terminal	LA120-DA



Software and Service Order Codes†

ULTRIX-32 H-kit media and documentation	QC821-H‡
ULTRIX-32 OSSP 1	QC821-5‡
VAX/VMS OSSP 2	QC821-7‡
ULTRIX-32 OSSP 3	QC821-B‡

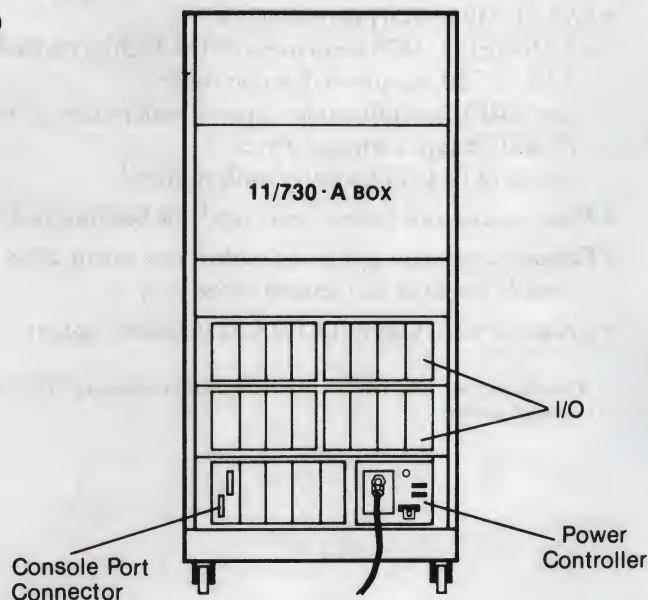
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

VAX-11/730

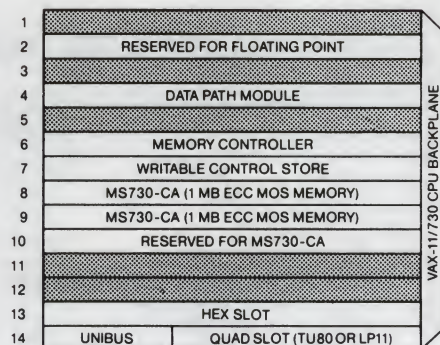


VAX-11/730 (Rear View)



VAX-11/730 CPU Cabinet System Backplane

DD11-DK UNIBUS Backplane



Note: Shaded areas indicate unusable space.

1	UNIBUS	QUAD SLOT
2		HEX SLOT
3		HEX SLOT
4		HEX SLOT
5		HEX SLOT
6		HEX SLOT
7		HEX SLOT
8		HEX SLOT
9	BUS TERM	QUAD SLOT

Available UNIBUS Expansion

Expansion Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
CPU Backplane 1 Hex slot, 1 Quad slot	16.0		1.4	19.0
DD11-DK Backplane 7 Hex slots, 2 Quad slots	32.0	2.9	3.0	

Digital's VAX-11/730 computer systems are one of the low-end members of the VAX family. These high-performance systems implement the VAX family architecture, making them software compatible with all other VAX systems. The central processor uses 32-bit architecture with four Gbytes of virtual addressing space.

Configuration Information

One VAX-11/730 packaged system is currently available with a choice of mass storage devices. This system includes the following:

- VAX-11/730 central processing unit:
 - 1-Mbyte ECC MOS main memory (64-K chip) expandable to five Mbytes
 - VAX-11/730 integrated disk controller
 - one DMF32 multifunction communications controller
 - dual TU58 tape cartridge drives
 - choice of LA12 or LA100 console terminal
- Mass storage (one system device and one backup/load device)
- Console subsystem composed of dual redundant TU58 tape cartridge drives, a console terminal, and remote access port
- Choice of VAX/VMS or ULTRIX-32 operating system*

*Consult the VAX/VMS SPD (25.01.xx) for details concerning RL02 distribution kits on VAX-11/730 packaged systems.

**Packaged VAX-11/730 VAX/VMS
Systems Add-On Options**

The following CPU, communications, mass storage, input/output, and expansion cabinetry options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Additional 64-K chip MS730 memory modules for as many as five modules (five Mbytes).
- FP730 floating-point accelerator (one per system).
- Remote diagnosis—available only under the terms and conditions of a current Digital Field Service contract. See Services section of this catalog.
- Two additional RL02 drives can be added on the RB730 disk controller.

Communications

- Maximum is dependent on total communications requirements and other considerations. Consult VAX/VMS SPD for details.
- Asynchronous interfaces: DZ11, DHU11, or DMF32 asynchronous communications interfaces, in any combination, but not to exceed 24 asynchronous lines per system.
- DEUNA, DMP11, DMR11, DR11-W, and DUP11 communications interfaces.

Mass Storage

UNIBUS

- RL02 cartridge disks (one RL211 subsystem per system, for as many as four drives).
- One UDA50 disk controller supporting as many as four of any combination of RA80, RA81, and RA60 drives.
- TU80 magnetic tape (one per system).
- RUC25 disk controller (one per system).

Input/Output

- LP32 lineprinters
- LP11 lineprinters
- Terminals, equal to the number of DMF32, DZ32, and/or DZ11 communication lines (not a system maximum or requirement. See VAX/VMS SPD for details).

Expansion Cabinet

- For UNIBUS expansion an H9642-FB/FD general purpose UNIBUS expansion cabinet, a BA11-K expander box, a DD11 expansion backplane and a shielded UNIBUS cable kit (CK-BC11Y-06) must be ordered.

R80/TS05 System with LA100

Order Code

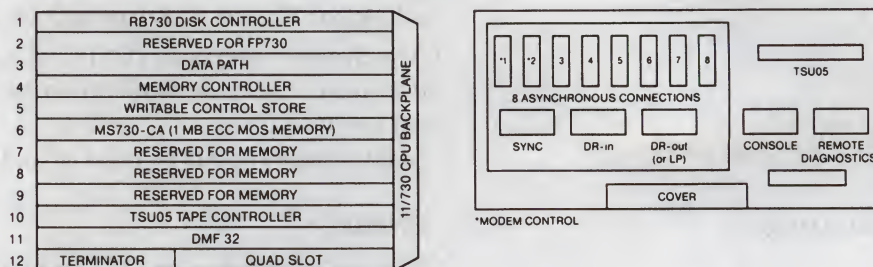
Components	Order Code
VAX-11/730 CPU	SV-CXWEA-GN
1-Mbyte (64-k chip) ECC MOS memory R80 121-Mbyte fixed media disk drive for use as the system device TSU05 40-Mbyte (formatted) one-half inch 1600 bpi/25-100 ips streaming magtape drive for use as the load/backup device DMF32 communications controller LA100 console terminal	

Configuration

The CPU cabinet contains the CPU backplane, and the R80, and the TSU05 magtape drives. The R80 disk drive is attached to the RB730 integrated disk controller. The TSU05 tape drive is attached to the M7455 controller. The VAX-11/730 CPU backplane has prewired designated slots for additional memory and the FP730 floating-point accelerator. The DMF32 asynchronous multiplexer is mounted in the CPU backplane as well.

System Backplane

Bulkhead-Connector Panel



Expansion

- CPU: space is dedicated for the FP730 floating-point accelerator.
- Memory: an additional 3 Mbytes of ECC MOS memory (one to three, 64-K chip memory array cards).
- Other options can be added using the H9642-FB or H9642-FC expansion cabinets. ABA11-K, DD11, and BC11Y UNIBUS expansion cable is required.

R80/RL02 System with LA100

Order Code

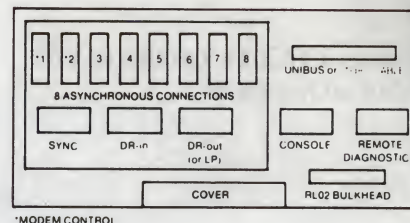
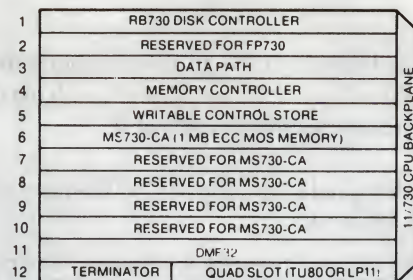
Components	Order Code
VAX-11/730 CPU	SV-CXWMA-GN
1-Mbyte (64-K chip) ECC MOS memory R80 121-Mbyte fixed media disk drive for use as the system device RL02 10.4-Mbyte cartridge disk drive for use as the backup/load device DMF32 communications controller LA100 console terminal	

Configuration

The CPU cabinet contains the CPU backplane, and the R80, and the RL02 disk drives. Both the R80 and RL02 disk drives are attached to the RB730 integrated disk controller. The VAX-11/730 CPU backplane has prewired designated slots for additional memory and the FP730 floating-point accelerator. The DMF32 asynchronous multiplexer is mounted in the CPU backplane as well. One quad-slot is available for mounting an additional UNIBUS option.

System Backplane

Bulkhead-Connector Panel



Expansion

- CPU: Space is dedicated for the FP730 floating-point accelerator.
- Memory: An additional four-Mbytes of ECC MOS memory (one to four, 64-K chip memory array cards).
- Disk drives: As many as two additional RL02 disk drives can be added on the RB730 for a system total of three RL02s and one R80. These additional RL02 drives must be mounted in a separate cabinet.

R80/RL02 System with LA12 Order Code

Components

Order Code

VAX-11/730 CPU

SV-CWWMA-HN

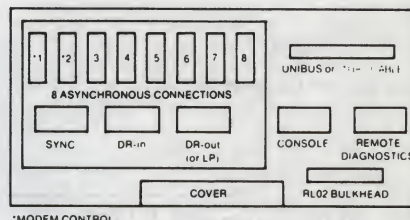
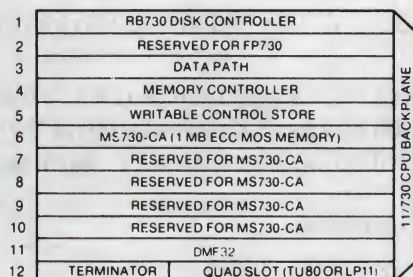
1-Mbyte (64-K chip) ECC MOS memory R80 121-Mbyte fixed media disk drive for use as the system device RL02 10.4-Mbyte cartridge disk drive for use as the backup/load device DMF32 communications controller LA12 console terminal

Configuration

The CPU cabinet contains the CPU backplane, and the R80, and the RL02 disk drives. Both the R80 and RL02 disk drives are attached to the RB730 integrated disk controller. The VAX-11/730 CPU backplane has prewired designated slots for additional memory and the FP730 floating-point accelerator. The DMF32 asynchronous multiplexer is mounted in the CPU backplane as well. One quad-slot is available for mounting an additional UNIBUS option.

System Backplane

Bulkhead-Connector Panel



Expansion

- CPU: Space is dedicated for the FP730 floating-point accelerator.
- Memory: An additional 4 Mbytes of ECC MOS memory (one to four, 64-K chip memory array cards).
- Disk drives: As many as two additional RL02 disk drives can be added on the RB730 for a system total of three RL02s and one R80. These additional RL02 drives must be mounted in a separate cabinet.

**Packaged VAX-11/730 ULTRIX-32
Add-On Options**

The following CPU, communications, mass storage, input/output, and expansion cabinetry options are allowed, with maximum quantities for each option in parentheses where applicable.

CPU

- Additional 64-K chip MS730 memory modules for as many as five modules (5 Mbytes).
- FP730 floating-point accelerator (one per system).
- Remote diagnosis—available only under the terms and conditions of a current Digital Field Service contract. See Services section of this catalog.
- Two additional RL02 drives can be added on the RB730 disk controller.

Communications†

- Maximums are dependent on total communications requirements and other considerations. Consult *ULTRIX-32 SPD* for details.
- Asynchronous interfaces—DZ11, DZ32, or DMF32‡ asynchronous communications interfaces, in any combination, but not to exceed 16 asynchronous lines per system.
- DEUNA and DMR11 communications interfaces.

†Please refer to the ULTRIX-32 software description in this catalog for details on login user limit size.

‡Only the asynchronous line of the DMF32 are supported

*Mass Storage**UNIBUS*

- RL02 cartridge disks (one RL211 subsystem per system, as many as four drives).
- One UDA50 disk controller supporting as many as four of any combination of RA80, RA81, and RA60 drives.
- TU80 magnetic tape (one per system).

Input/Output

- LP11 lineprinters.
- Terminals—see *ULTRIX-32 SPD* for details.

Expansion Cabinet

- For UNIBUS expansion an H9642-FB or -FD general purpose UNIBUS expansion cabinet, a BA11-K expander box, a DD11 expansion backplane, and a shielded UNIBUS cable kit (CK-BC11Y-06) must be ordered.

**R80/RL02 System with LA100
Order Code**

Components	Order Code
VAX-11/730 CPU	SU-CXWMA-GN
1-Mbyte (64-K chip) ECC MOS memory R80 121-Mbyte fixed media disk drive for use as the system device RL02 10.4-Mbyte cartridge disk drive for use as the backup/load device DMF32 communications controller* LA100 console terminal	

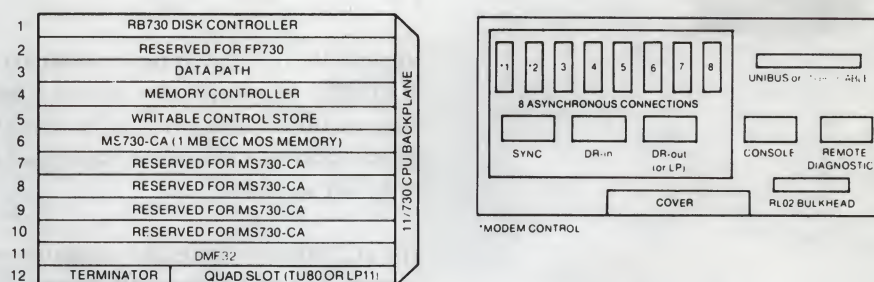
*Only the asynchronous lines of the DMF32 are supported by the ULTRIX-32 operating system.

Configuration

The CPU cabinet contains the CPU backplane, and the R80, and the RL02 disk drives. Both the R80 and RL02 disk drives are attached to the RB730 integrated disk controller. The VAX-11/730 CPU backplane has prewired designated slots for additional memory and the FP730 floating-point accelerator. The DMF32 asynchronous multiplexer is mounted in the CPU backplane as well. One quad-slot is available for mounting an additional UNIBUS option.

System Backplane

Bulkhead-Connector Panel



Expansion

- CPU: Space is dedicated for the FP730 floating-point accelerator.
- Memory: An additional 4 Mbytes of ECC MOS memory (one to four, 64-K chip memory array cards).
- Disk drives: As many as two additional RL02 disk drives can be added on the RB730, for a system total of three RL02s and one R80. These additional RL02 drives must be mounted in a separate cabinet.

R80/RL02 System With LA12 Order Code

Components	Order Code
VAX-11/730 CPU	SV-CXWMA-HN

1-Mbyte (64-K chip) ECC MOS memory R80 121-Mbyte fixed media disk drive for use as the system device RL02 10.4-Mbyte cartridge disk drive for use as the backup/load device DMF32 communications controller* LA12 console terminal

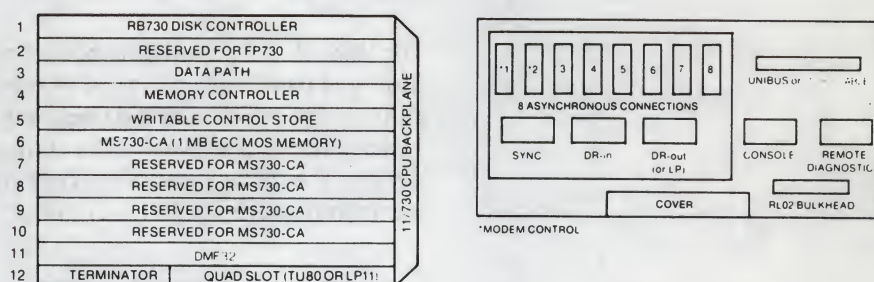
*Only the asynchronous lines of the DMF32 are supported by the ULTRIX-32 operating system.

Configuration

The CPU cabinet contains the CPU backplane, and the R80, and the RL02 disk drives. Both the R80 and RL02 disk drives are attached to the RB730 integrated disk controller. The VAX-11/730 CPU backplane has prewired designated slots for additional memory and the FP730 floating-point accelerator. The DMF32 asynchronous multiplexer is mounted in the CPU backplane as well. One quad-slot is available for mounting an additional UNIBUS option.

System Backplane

Bulkhead-Connector Panel



Expansion

- CPU: Space is dedicated for the FP730 floating-point accelerator.
- Memory: An additional 4 Mbytes of ECC MOS memory (one to four, 64-K chip memory array cards).
- Disk drives: As many as two additional RL02 disk drives can be added on the RB730 for a system total of three RL02s and one R80. These additional RL02 drives must be mounted in a separate cabinet.



Digital's VAX-11/725 is the smallest, most affordably priced UNIBUS VAX/VMS or ULTRIX-32 system. This compact, quiet system was designed specifically for open offices and contains the new RC25 disk subsystem. The VAX-11/725 appeals both as a CPU for a single-user workstation and as a low-priced, multiuser system.

The RC25 disk provides the reliability and performance of Winchester technology with the flexibility of removable media.

The RC25 contains an intelligent controller, onboard microdiagnostics, and 52 Mbytes of storage space. Of the 52 Mbytes of storage space, 26 Mbytes are on a fixed platter. The remaining 26 Mbytes are stored on an 8-inch removable cartridge. This allows the copying of disks to be accomplished with a one-to-one backup ratio.

Standard Components

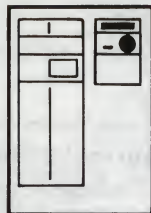
- VAX-11/730 CPU
- 1 Mbyte MS730-CA (64-K chip) ECC MOS memory
- Two TU58 tape cartridge drives
- RC25 52 Mbyte (26 Mbytes fixed, 26 Mbytes removable) 8-inch Winchester disk with controller
- Pedestal cabinet: 44.45 centimeters (17.5 inches) wide by 62.23 centimeters (24.5 inches) high by 72.39 centimeters (28.5 inches) deep
- Choice of VAX/VMS or ULTRIX-32 operating system license and warranty
- Power controller and power supply
- 7.6-meter (25-foot) console cable

Configuration Information

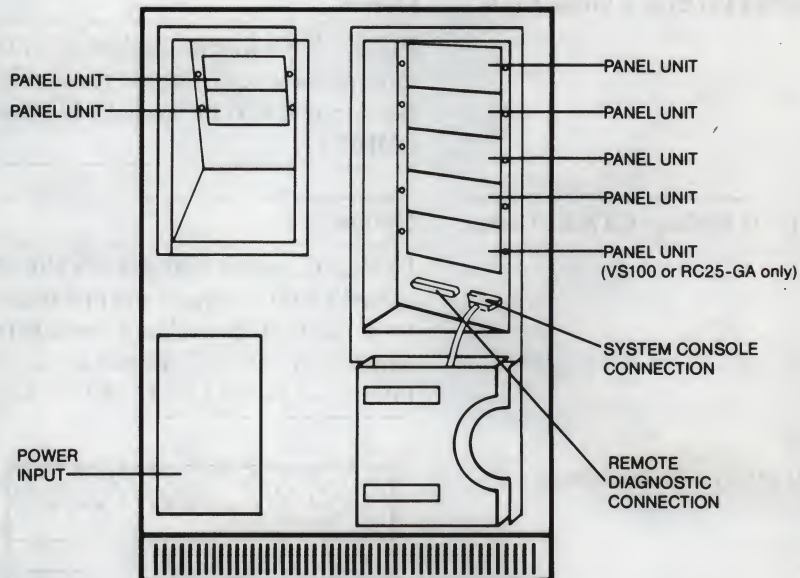
The CPU pedestal cabinet contains the RC25 Winchester disk drive and the CPU backplane. There is no backplane expansion capability external to the pedestal cabinet. Customers must purchase a VT100, VT125, VT200, VT240, VT241, LA100, or LA12 console device.

The VAX-11/725 provides six general purpose panel units and one VS100-dedicated panel unit on the real I/O connection panel. These are arranged in one group of five panel units and one group of two panel units. Depending on which package system is selected, some of these panel units are available for supported devices. The *first* system ordered requires a QC001-H4 (H-kit media and documentation) and the QC001-AZ option.

VAX-11/725 CPU Cabinet



VAX-11/725 Cabinet (Rear View)



The VAX-11/725 is offered in three packaged systems. These systems differ in the number of available backplane slots, in the number of available panel units, and in the components included. The devices that can be mounted in the backplane slots are listed in the following table.

VAX-11/725 Supported Devices

Device	Maximum Quantity Supported	Required Slots (each)	Required Panel Units
MS730-CA	3	1	N/A
FP730	1	1	N/A
DMF32-LE	1 ¹	1	4
DEUNA-AA	1	2	2
DMR11-AY	1 ²	2	1
DMR11-BE		2	1
DMR11-CE		2	2
DMR11-EE		2	1
DMR11-FE		2	2
VS100 Controller	1	1	1

¹ With ULTRIX-32 only the asynchronous lines and printer port interface of the DMF32 are supported.

² Only one DMR11 is supported.

Available Electric Power

Package	DC Amps @			Watts
	+5V	+15V	-15V	
SV-CXNZA	42.6	1.9	2.9	267.4
SV-CXNZB	34.0	1.4	2.4	195.9
SV-CXNZC	8.5	1.4	1.4	53.4

Ordering Information

VAX-11/725 Package A Order Code

Option

Order Code

Package A, the entry-level system has six backplane slots, one of which is dedicated to the FP730 and another dedicated to a second MS730. Package A has seven panel units, one of which is dedicated to a VS100.

SV-CXNZA-EN

VAX-11/725 Package B Order Code

Option

Order Code

Package B has four available slots and two available panel units plus a special purpose panel unit. Included in Package B is a second MS730 (total of 2 Mbytes in system) and one DMF32-LF.

SV-CXNZB-EN

VAX-11/725 Package C Order Code

Option

Order Code

Package C has one available slot (for MS730 or other supported UNIBUS option) and one available panel unit plus a VS100 dedicated panel unit. Included in Package C is a second MS730 (total of 2 Mbytes in system), one DMF32, one FP730, one DEUNA, and a DECnet license.

SV-CXNZC-EN

VAX-11/725 System Backplane

1		
2	DEDICATED FOR FP730	
3	DATA PATH	
4	MEMORY CONTROLLER	
5	WRITABLE CONTROL STORE	
6	MS730-CA (1 MB ECC MOS MEMORY)	
7	DEDICATED FOR MS730-CA (1 MB ECC MOS MEMORY)	
8	HEX SLOT FOR MS730-CA OR UNIBUS OPTION	
9	HEX SLOT FOR UNIBUS OPTION	
10	HEX SLOT FOR UNIBUS OPTION	
11	HEX SLOT FOR UNIBUS OPTION	
12	TERMINATOR	RC25 CONTROLLER

SV-CXNZA

1		
2	DEDICATED FOR FP730	
3	DATA PATH	
4	MEMORY CONTROLLER	
5	WRITABLE CONTROL STORE	
6	MS730-CA (1 MB ECC MOS MEMORY)	
7	MS730-CA (1 MB ECC MOS MEMORY)	
8	HEX SLOT FOR MS730-CA OR UNIBUS OPTION	
9	HEX SLOT FOR UNIBUS OPTION	
10	HEX SLOT FOR UNIBUS OPTION	
11	DMF32-LP	
12	TERMINATOR	RC25 CONTROLLER

SV-CXNZB

1		
2	FP730	
3	DATA PATH	
4	MEMORY CONTROLLER	
5	WRITABLE CONTROL STORE	
6	MS730-CA (1 MB ECC MOS MEMORY)	
7	MS730-CA (1 MB ECC MOS MEMORY)	
8	HEX SLOT FOR MS730-CA OR UNIBUS OPTION	
9	DEUNA MODULE 1	
10	DEUNA MODULE 2	
11	DMF32-LP	
12	TERMINATOR	RC25 CONTROLLER

SV-CXNZC



Product Description

The MicroVAX II microcomputer is the newest member of Digital's 32-bit VAX family of computer systems using the extended Q-bus.

Engineered to perform a wide range of applications, including realtime applications, office automation, and general purpose programming, the MicroVAX II microcomputer gives you software compatibility with larger VAX systems. Any nonprivileged, native-mode program that runs on a VAX/VMS system will execute unmodified on a MicroVAX II microcomputer.

The MicroVAX II system can operate in any normal office environment—it doesn't need a special computer room. No special air conditioning is required. It is available in a new castermounted office enclosure that fits comfortably under a table or into a corner and as a standard pedestal package.

The MicroVAX II microcomputer is customer installable and easy to operate. It has a rear I/O distribution panel that provides simple plug-in connectors for terminals, network interfaces, and other cables. The MicroVAX II system runs on standard 15 amp electrical lines. No special wiring is required.

The MicroVAX II system can be part of a network by using an Ethernet Q-bus interface. Networking applications can be other MicroVAX II systems such as in an applications development environment, or departmental systems or VAXclusters that can be used for managerial applications and data collection, for example.

12 months onsite warranty is included in all MicroVAX II, VAXstation II and VS 520 systems in Europe.

Hardware

The MicroVAX II CPU consists of a single quad-sized MicroVAX II processor board, including the MicroVAX 32-bit central processor chip (which includes memory management), an optional floating-point coprocessor chip, one Mbyte of onboard memory, Q22-bus interface, Q22-map for DMA transfers, interval timer, boot and diagnostic facility, console serial line unit, and time-of-year clock with battery backup support.

The MicroVAX II uses the CD backplane interconnect and a 50-pin connector to communicate with as many as two high-speed, tightly coupled memory expansion modules, each of which may contain one, two, or four Mbytes of local memory.

The MicroVAX II microcomputer standard features

- MicroVAX II native-mode instruction set.
- Single (F), double-precision (D), or grand (G) floating-point datatypes on FPU chip.
- 8-slot (BA23) or 12-slot (BA123) extended Q-bus backplane.
- 8-Kbyte I/O space.
- Extended block mode transfer support.
- 10-millisecond interval timer.
- Console serial line.
- 64-KByte boot and diagnostic ROM, in 11 languages.
- VAX ASCII console and TTY emulation.
- Microverify self-test diagnostics.
- Mass storage control protocol.
- 230- or 460-watt switching power supply.
- I/O distribution panel with inserts for expansion.

The MicroVAX II microcomputer optional features

- 1-Mbyte, 2-Mbyte, or 4-Mbyte parity MOS memory increments.
- 31- or 71-Mbyte fixed Winchester disk subsystem.
- 95-Mbyte cartridge streaming tape.
- RC25 26/26 Mbyte master drive, as an add-on device.
- 2 × 400-Kbyte diskette subsystem.
- Disk controller for both Winchester disk and diskette subsystems.
- Ethernet Q-bus interface.
- Asynchronous and synchronous communication options.

Software

A realtime programming tool kit and two VAX-compatible virtual memory operating systems provide a range of VAX solutions for 32-bit microcomputer users. They are the following:

- **VAXELN**—A fully modular software system that lets programmers build dedicated, realtime applications on VAX/VMS development systems. The VAXELN toolkit uses the Pascal language and is layered on the VAX/VMS operating system as a development tool. After development, VAXELN applications run stand-alone on VAX or MicroVAX II target systems via the kernel executive.
- **MicroVMS**—A fully compatible modular version of the VAX/VMS operating system. The MicroVMS operating system can be used in both the general purpose multifunction and multiuser environments.
- **MicroVAX ULTRIX-32m**—A stand-alone operating system based on the UNIX™ (Berkeley Version 4.2) operating system for the multiuser development environment.

I/O Distribution Panel Inserts

The I/O distribution panel on the MicroVAX II (BA23 package) supports four 5.3 by 7.9-centimeter (2 by 3-inch) size B inserts, plus two 2.5 by 10.2-centimeter (1 by 4-inch) size A inserts. The I/O distribution panel on the MicroVAX II (BA123 package) supports six 5.3 by 7.9-centimeter (2 by 3-inch) size B inserts, plus four 2.5 by 10.2-centimeter (1 by 4-inch) size A inserts. For both the BA23 and BA123 packages removing the post shown in the System Configurators, two size B inserts can be configured as three size A inserts. One size B insert is reserved for the CPU console terminal.

Configuring Information

Available power and backplane slots are the limiting factors in configuring MicroVAX II systems. As with other Q-bus systems, memory cards should immediately follow the CPU, then be followed by option cards in descending priority.

Because of cabling restrictions, the RQDX2 controller must reside in the last occupied option slot. Only one RQDX2 can be installed in the MicroVAX II system.

Power for the disk drives must also be subtracted from the total. An RX50 and RD52 together draw 1.9 amps at +5 V and 4.3 amps at +12 V, which makes a combined power requirement of 61.1 watts. An RX50 and RD53 together draw 1.8 amps at +5 V and 4.3 amps at +12 V, which makes a combined total of 61.8 watts.

The first MS630-AA memory option draws 1.0 amps at +5 V. The second and subsequent options draw 1.3 amps of "stand-by" power. This memory is unique to MicroVAX II and is not compatible with any existing Q-bus memories.

If your configuration includes DEQNA modules, place them in the slots following the last memory module. A MicroVAX II system can have a maximum of two DEQNA modules. Check the appropriate SPD for software support.

The MicroVAX II BA23 pedestal or rackmount enclosure Q-bus backplane has a total of eight slots. It contains a 230-watt power supply and dedicated space for two 13.3-centimeter (5.25-inch) mass storage devices. When configuring the BA23 pedestal or rackmountable systems

1. Use the eight slot configuration worksheet. Write the module and mass-storage device names in the left column beside the slot and shelf numbers. When configuring these systems, please note that quad-height modules use both the "AB" and "CD" portions of a slot.
2. Slots two and three can accommodate either one dual-height or one quad-height Q-bus option. However, if an MS630-AA memory option is installed in the "CD" rows of either of these slots, then the "AB" rows of the corresponding slot can accommodate only a dual-height option.
3. Slots four through eight can accommodate either two dual-height or one quad-height option.
4. Enter the +5 V and +12 V currents, power, the ac and dc bus loads, and I/O panel inserts required for each module and mass-storage device. The column totals must not exceed the limits listed at the bottom.

SLOT	MODULE	Current (Amps)		Power (Watts)	(2x3)		(1x4)
		+ 5vdc	+ 12vdc		B	A	
1	KA630	6.2	0.14	32.7	1	0	
2 AB							
2 CD							
3 AB							
3 CD							
4 AB							
4 CD							
5 AB							
5 CD							
6 AB							
6 CD							
7 AB							
7 CD							
8 AB							
8 CD							
Mass-storage Shelf Device							
1							
2							
Total these Columns:							
Must not Exceed:		36A	7A	230W	4	2	

MicroVAX II BA23 System Building Blocks

Part I - Mandatory Hardware and Software Section

Step		Qty Ord	Part Number	Product Description	Product/Order Limitations, Remarks
1.1 System Building Blocks	[]	-	630QY-A2	MicroVAX II with Floating Point & 1 MB on-board memory in BA23 Pedestal enclosure. Includes console terminal port, cable for console terminal, and U.S. power cord. Same as above, 240V model. Power cord not included.	
		-	630QY-A3		
	[]	-	630QZ-A2	Same as 630QY-A2, but rackmount instead of pedestal enclosure.	
		-	630QZ-A3	Same as 630QY-A3, but rackmount instead of pedestal enclosure.	
1.2 Documentation and Diagnostics	[]	-	ZNAAA-Cn	Owner & Technical manuals, Installation Diagnostics, (English language).	Diagnostics required to install system. Order one set per system. In place of "n" in -Cn enter: 3 - RX50 media 5 - TK50 media
1.3 Power Cord	[]	-	BN02A-2E	UK/Ireland	Required for each 240V system.
		-	BN03A-2E	Austria, Belgium, France, Germany, Finland, Netherlands, Norway, Portugal, Spain, Sweden	
		-	BN04A-2E	Switzerland	
		-	BN05A-2E	Australia	
		-	BN06A-2E	Denmark	
		-	BN07A-2E	Italy	
		-	17-00083-01	U.S. - 240V	
		-	17-00083-25	Japan - 120V	
		-	17-00457-00	Israel	
1.4 Mass Storage Combination	[]	1	RD52A-AA	31 MB Disk Drive	Choose only one combination, order in quantities shown per system.
		1	RQDX2-AA	RDRX Controller	
		1	TK50-AA	95 MB Tape drive w/cartridge	
		1	TQK50-AA	TK50 Controller	
	[]	1	RD52A-AA	31 MB Disk Drive	Note: RD/TK systems require at least 2MBoF memory.
		1	RX50A-AA	Dual Diskette Drive	
		1	RQDX2-AA	RDRX Controller	
	[]	1	RD53A-AA	71 MB Disk Drive	
		1	RQDX2-AA	RDRX Controller	
		1	TK50-AA	95 MB Tape drive w/cartridge	
		1	TQK50-AA	TK Controller	
	[]	1	RD53A-AA	71 MB Disk Drive	
		1	RX50A-AA	Dual Diskette Drive	
		1	RQDX2-AA	RDRX Controller	
1.5 Operating System Software Licenses					Order at least one license per system.
MicroVMS	[]	-	QZ001-CZ	MicroVMS 1-2 User License	
		-	QZ002-Cn	MicroVMS 1-8 User License/key	In place of "N" in -Cn enter: 3 for RX50 media, 5 for TK50 media.
		-	QZ003-Cn	MicroVMS 1-16 User License/key	
		-	QZ004-Cn	MicroVMS 1-N User License/key	
VAXELN	[]	-	QZ376-DZ	VAXELN Target License	
ULTRIX-32M	[]	-	QZ832-UZ	ULTRIX-32M 1-2 User License	
		-	QZ833-UZ	ULTRIX-32M 1-8 User License	
		-	QZ837-UZ	ULTRIX-32M 1-16 User License	

Part 2 - Optional Hardware

2.1 Console Terminal*	[]	-	LA100-BA	Table-top printing term., 120V	Choose only one per system. Cable for console terminal included with each Base Hardware System (BCC08-10, 10' long).
	[]	-	LA120-DA	Floor stand print term., 120/240V	(Optional on order, mandatory for functional system)
	[]	-	VT220-A2	Black/white video terminal, 120V	Choose one of these keyboard kits for each VT220-A2 ordered.
		-	VT22K-AA	Standard keyboard, manuals	
		-	VT22K-BA	Word Proces. keyboard, manuals	
2.2 Additional Memory	[]	-	MS630-AA	1 MB MOS Memory	Maximum two memory boards per system.
		-	MS630-BA	2 MB MOS Memory	
		-	MS630-BB	4 MB MOS Memory	
2.3 Additional Serial Lines	[]	-	DZQ11-DB	4 Serial Lines	Choose only one per system (DZQ11 or DHV11).
	[]	-	DHV11-AB	8 Serial Lines	
2.4 Networking Hardware Options	[]	-	DEQNA-KB	Ethernet to Q-bus comm. ctrl.	Choose only one networking option per system.
	[]	-	DPV11-AB	Synchronous comm. ctrl.	

1.64 Systems

Configuration Rules for MicroVAX II BA123 System

The MicroVAX II BA123 enclosure uses two 230-watt power supplies, and the backplane is wired to distribute the load over both supplies. Regulator "A" supplies power for slots 1, 3, 5, 7, 9, and 11 and mass storage shelves 3, 4, and 5. Regulator "B" supplies power for slots 2, 4, 6, 8, 10, and 12 and mass storage shelves 1 and 2. When configuring the BA123 castermounted enclosure

1. Use the 12 slot configuration worksheet. Write the module and mass-storage device names in the left column beside the slot and shelf numbers. When configuring these systems, please note that quad-height modules use both the “AB” and “CD” portions of a slot.
2. Slots 1 through 4 are limited to either one quad- or one dual-height option. However, if a MS630-AA memory option is installed in the “CD” row of slot two or three, then the “AB” portion of that slot can accommodate a dual-height option.
3. Slots 5 through 12 can accommodate either one quad-height or two dual-height options.
4. Enter the +5 V and +12 V currents, power, the ac and dc bus loads and I/O panel inserts required for each module and mass-storage device. Be sure that you enter the power for each option in the columns of the appropriate regulator. The column totals must not exceed the limits listed at the bottom.

Configuration Worksheet For 630QB MicroVAX II System Building Blocks

SLOT		MODULE	Regulator A		Regulator B		AC	DC	I/O Inserts			
			Current (Amps) + 5vdc	Current (Amps) + 12vdc	Power (Watts)	Current (Amps) + 5vdc	Current (Amps) + 12vdc	Power (Watts)	Loads	Loads	(2x3) B	(1x4) A
1	AB	KA630	6.2	0.14	32.7							
2	CD								2.7	1.0	1	0
3	AB											
4	CD											
5	AB											
6	CD											
7	AB											
8	CD											
9	AB											
10	CD											
11	AB											
12	CD											
13	AB											
	CD											
		signal dist.	.52		2.60							
		Mass-storage Shelf Device										
5								0	0	0	0	
4								0	0	0	0	
3								0	0	0	0	
2								0	0	0	0	
1								0	0	0	0	
		Total these Columns:										
		Must not Exceed:	36A	7A	230W	36A	7A	230W	38	20	6	4

Part I – Mandatory Hardware and Software Section

Step		Qty Ord	Part Number	Product Description	Product/Order Limitations, Remarks
1.1	System Building Blocks	[]	-	630QB-A2	MicroVAX II with Floating Point & 1 MB on-board memory in BA123 enclosure. Includes console terminal port, cable for console terminal, and U.S. power cord.
			-	630QB-A3	Same as above, 240V model. Power cord not included.
1.2	Documentation and Diagnostics	[]	-	ZNAAB-Cn	Owner/Technical Manuals, Installation Diagnostics. (English language). Diagnostics required to install system. Order one set per system. In place of "n" in -Cn enter: 3 – RX50 media 5 – TK50 media
1.3	Power Cord	[]	-	BN02A-2E	UK/Ireland
			-	BN03A-2E	Austria, Belgium, France, Germany, Finland, Netherlands, Norway, Portugal, Spain, Sweden
			-	BN04A-2E	Switzerland
			-	BN05A-2E	Australia
			-	BN06A-2E	Denmark
			-	BN07A-2E	Italy
			-	17-00083-01	U.S. – 240V
			-	17-00083-25	Japan – 120V
			-	17-00457-00	Israel

1.4	Mass Storage Combination	[]	1 to 3	RD52A-BA	31 MB Disk Drive	Choose one combination, order in quantities shown per system.	
			1	RQDX2-BA	RDRX Controller		
			1	TK50-AA	95 MB Tape drive w/cartridge		
			1	TQK50-BA	TK50 Controller		
	RD52, TK						
	RD52, RX	[]	1 or 2	RD52A-BA	31 MB Disk Drive	Note: RD/TK systems require at least 2MB of memory.	
			1	RX50A-BA	Dual Diskette Drive		
			1	RQDX2-BA	RDRX Controller		
	RD52, RX, TK	[]	1 or 2	RD52A-BA	31 MB Disk Drive		
			1	RX50A-BA	Dual Diskette Drive		
1			RQDX2-BA	RDRX Controller			
1			TK50-AA	95 MB Tape drive w/cartridge			
1			TQK50-BA	TK50 Controller			
RD52, TK	[]	1 to 3	RD53A-BA	71 MB Disk Drive			
		1	RQDX2-BA	RDRX Controller			
		1	TK50-AA	95 MB Tape drive w/cartridge			
		1	TQK50-BA	TK Controller			
RD53, RX	[]	1 or 2	RD53A-BA	71 MB Disk Drive			
		1	RX50A-BA	Dual Diskette Drive			
		1	RQDX2-BA	RDRX Controller			
RD53, RX, TK	[]	1 or 2	RD53A-BA	71 MB Disk Drive			
		1	RX50A-BA	Dual Diskette Drive			
		1	RQDX2-BA	RDRX Controller			
		1	TK50-AA	95 MB Tape drive w/cartridge			
		1	TQK50-BA	TK50 Controller Kit			
1.5 Operating System Software Licenses						Order at least one license per system.	
MicroVMS	[]	-	QZ001-CZ	MicroVMS 1-2 User License	In place of "N" in -Cn enter: 3 for RX50 media, 5 for TK50 media.		
		-	QZ002-Cn	MicroVMS 1-8 User License/key			
		-	QZ003-Cn	MicroVMS 1-16 User License/key			
		-	QZ004-Cn	MicroVMS 1-N User License/key			
VAXELN	[]	-	QZ376-DZ	VAXELN Target License			
ULTRIX-32M	[]	-	QZ832-UZ	ULTRIX-32M 1-2 User License			
		-	QZ833-UZ	ULTRIX-32M 1-8 User License			
		-	QZ837-UZ	ULTRIX-32M 1-16 User License			

Part 2 – Optional Hardware

2.1 Console Terminal*	[]	–	LA100-BA	Table-top printing term., 120V	Choose only one per system. Cable for console terminal included with each Base Hardware System (BCC08-10, 10' long).
	[]	–	LA120-DA	Floor stand print term., 120/240V	(Optional on order, mandatory for functional system)
	[]	–	VT220-A2	Black/white video terminal, 120V	Choose one of these keyboard kits for each VT220-A2 ordered.
		–	VT22K-AA	Standard keyboard, manuals	
		–	VT22K-BA	Word Proces. keyboard, manuals	
2.2 Additional Memory	[]	–	MS630-AA	1 MB MOS Memory	Maximum two memory boards per system.
		–	MS630-BA	2 MB MOS Memory	
		–	MS630-BB	4 MB MOS Memory	
2.3 Additional Serial Lines	[]	1	DZQ11-DA	4 Serial Lines	Order only one multiplexer combination per system. Example: For 20 serial lines, order 1 DZQ11 and 2 DHV11.
	[]	1	DHV11-AA	8 Serial Lines	
	[]	1	DZQ11-DA	12 Serial Lines	
		1	DHV11-AA		
	[]	2	DHV11-AA	16 Serial Lines	
	[]	1	DZQ11-DA	20 Serial Lines	
2.4 Networking Hardware Options	[]	–	DEQNA-KA	Ethernet to Q-bus comm. ctrl.	Maximum one of each per system.
	[]	–	DPV11-A A	Single line sync comm ctrl.	

Ordering Information*Memory Options*

MS630 Order Codes

Option	Order Code
1-Mbyte parity MOS memory.	MS630-AA
2-MByte parity MOS memory	MS630-BA
4-MByte parity MOS memory.	MS630-BB

Product Description

TK50

The TK50 is Digital's industry-leadership tape subsystem for MicroVAX II. The TK50 combines reliability, compatibility, and high performance with innovative, simplified streaming.

Its 95 Mbyte capacity allows it to back up any of Digital's mini-Winchester disks onto a single CompacTape cartridge. It is small enough to fit into the same size slot as a minifloppy drive (such as an RX50) in a MicroVAX II system box, or to be mounted in small tabletop or rackmountable enclosures designed for 5.25-inch form factor storage devices.

Performance Characteristics

- Read/write speed: 75 in/s, streaming
- Peak Data transfer rate: Total: 62.5 Kbytes/s, User Data: 45 Kbytes/s
- Number of tracks: 22
- Recording method: Serial, serpentine pattern
- Recording Density: 6667 bits/in
- Record size: Variable to (64 Kbytes-1 byte)
- Maximum capacity: 95 Mbytes (formatted)
- Recording medium: 182.9-m (600-ft) length, 1.3-cm (0.5 in) width magnetic tape

TK50 Order Codes

Option	Order Code
95-Mbyte cartridge tape drive (requires TQK50-AA or TQK50-BA)	TK50-AA
TK50 cartridge tape controller with cables for use in BA23	TQK50-AA
TK50 cartridge tape controller with cables for use in BA123	TQK50-BA

The Compact Disk Reader is a low-cost laser disk reader capable of randomly accessing 600 Mbytes of formatted user data from a small, removable disk known as CDROM (Compact Disk Read Only Memory). It offers outstanding reliability and high data integrity, equivalent to magnetic disks.

The reader's small size, quietness, and design make it ideal for the office environment. The CDROM disk organizes the digital data into fixed-length blocks. The drive uses a focused laser beam to track and detect binary information stored as pits on the reflective layer within the disk. Because the information carrying layer is beneath the disk surface, the disks are durable and much easier to handle than magnetic media.

Performance Characteristics

- Average access time: 1.5 seconds
- Average transfer rate: 150 Kbytes/s
- Capacity: 600 Mbytes formatted per disk
- Format: Philips/Sony standard for compact disks
- Corrected bit error rate: 10^{-12}
- Medium: Pre-formatted optical disk, 120 mm (4.7 inch) diameter

RD50 Order Codes

Option	Order Code
600 Mbyte CDROM disk drive	RRD50-A3
RRD50-A3 with Q-bus controller and cables for use with BA23 and BA123 enclosure	RRD50-QC

RD53

The RD53 is a 71-Mbyte, fixed disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing that conforms to the industry standards for 5.25-inch disk media.

The RD53 has an average seek time of 30 milliseconds, transfer rate of 5 Mbits per second (625 Kbytes per second), and an average rotational latency of 8.33 milliseconds.

Performance Characteristics

- Formatted capacity: 71 Mbytes
- Bytes per sector: 512
- Sectors per track: 16

RD53 Order Codes

Option	Order Code
71-Mbyte disk with cables for use in BA23	RD53A-AA
71-Mbyte disk with cables for use in BA123	RD53A-BA

The RD52 is a 31-Mbyte, fixed disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing that conforms to the industry standards for 5.25-inch disk media.

The RD52 has an average seektime of 49 milliseconds, transfer rate of 5 Mbits per second (625 Kbytes per second), and an average rotational latency of 8.5 milliseconds.

Performance Characteristics

- Formatted capacity: 31 Mbytes
- Bytes per sector: 512
- Sectors per track: 16

RD52 Order Codes

Option	Order Code
31-Mbyte Winchester disk drive with cables for BA23	RD52A-AA
31-Mbyte Winchester disk drive with cables for BA123	RD52A-BA

RC25 Fixed/Removable Disk

The RC25 Fixed/Removable Disk subsystem has 52 Mbytes of formatted user data. The 25.4 by 25.4 by 50.8-centimeter (10 by 10 by 20-inch) stand-alone unit contains an intelligent controller and onboard microdiagnostics. The fixed disk is a 26-Mbytes Winchester that combined with the RC25's 26-Mbytes sealed removable cartridge, provides one-to-one backup ratio and an attractive alternative to disk/tape configurations.

By utilizing Mass Storage Control Protocol support, the RC25 is compatible with other Digital Storage Architecture disk subsystems. Exceptional data reliability and integrity features include a powerful 170-bit error detection and correction code, automatic retry and revectoring, embedded servos, and bad block replacement.

Performance Characteristics

- Peak transfer rate: 1.25 Mbytes/s
- Seek time: 10 msec
- Track-to-track: 10 msec
- Average: 35 msec
- Maximum: 55 msec
- Average rotational latency: 10.5 msec
- Average access time: 45.5 msec
- Formatted capacity per drive: 52 Mbytes

Expansion Specifications

- Drives per controller: Two

RC25 Order Codes

Option	Order Code
Tabletop RC25 with Q-bus controller.	RQC25-AB
Rackmountable RC25 with Q-bus controller.	RQC25-BB
Rackmountable dual RC25s with Q-bus controller.	RQC25-CB
Disk Drives	
Tabletop add-on RC25.	RC25-DB
Rackmountable add-on RC25.	RC25-EB
Tabletop add-on RC25 for VAX-11/725 only.	RC25-GB
Disk Cartridges	
Removable 26-MB RC25 cartridge.	RC25K-DC

The RX50 dual diskette drive can accommodate two diskettes simultaneously. One diskette can be used for system programs, and the other allocated as a file device. It stores data in fixed-length blocks on two 5.25-inch flexible diskettes using preformatted industry-standard headers. It has a peak transfer rate of 250,000 bits per second, an average seek time of 164 milliseconds and a rotational latency (average) of 100 milliseconds.

Performance Characteristics

- Formatted capacity per diskette: 409 Kbytes (818 Kbytes total)
- Diskettes per drive: 2
- Recording surfaces per diskette: 1
- Bytes per sector: 512
- Sectors per track: 10
- Tracks per diskette: 80

RX50 Order Codes

Option	Order Code
RX50 with cables for BA23	RX50A-AA
RX50 with cables for BA123	RX50A-BA

RQDX2

The RQDX2 controller is used to interface the RD52 31-Mbyte or the RD53 71-Mbyte Winchester disk drives and the RX50, 0.8-Mbyte diskette drives to the Q-bus. Data transfer to the host system is via efficient block-mode DMA. The RQDX2 is an intelligent controller with an onboard microprocessor. Programs in the host system communicate with the controller and drives using the Mass Storage Control Protocol (MSCP) of the Digital Storage Architecture. MSCP and the RQDX2 include features to enhance system throughput, ensure data integrity, and increase subsystem availability.

An RQDX2 can control a maximum of four drives. Each RD52 or RD53 disk counts as one drive, with a maximum of four RD52 or RD53 units per controller. However, because of power and cooling limitations, only three RD52s or RD53s are allowed in the BA123 enclosure. Each RX50 counts as two drives.

RQDX2 Order Codes

Option	Order Code
Disk controller with cables for use with BA23	RQDX2-AA
Disk controller with cables for use with BA123	RQDX2-BA

KMV11-A

The KMV11-A is a high performance, direct memory access, single-line programmable communications controller that provides interconnection between Q-bus systems with EIA RS-232-C/CCITT V.28, EIA RS-422/CCITT V.11, and EIA RS-423/CCITT V.10 interfaces. It is capable of communications speeds up to 64,000 bits per second. Used on the MicroVAX II system, it utilizes the Micro/T11 Processor to perform user-defined communications functions, thereby freeing the host to do more application computations.

The KMV11-A can be programmed in synchronous or asynchronous modes. It also provides full-modem support for Digital's family of modems, the Bell 200 Series or equivalent, and European PPT-approved modems. KMV11-A supports a software tools package, X.25 link level, and HDLC framing software.

KMV11 Order Codes

Option	Order Code
Single-line, direct memory access, programmable communications controller. Supports EIA RS232-C/CCITT V.28 operations at 19.2 Kbytes/s. For use on MicroVAX II BA123 systems. External cable not included, BC22F-xx is the recommended cable.	KMV1A-AA
Single-line, direct memory access, programmable communications controller. Supports EIA RS232-C/CCITT V.28 operations at 19.2 Kbytes/s. For use on MicroVAX II BA23 systems. External cable not included, BC22F-xx is the recommended cable.	KMV1A-AB
Supports EIA RS422/CCITT V.11 operation to a maximum of 64 Kbytes/s. For use on MicroVAX II BA123 systems. External cable not available from Digital.	KMV1A-EA
Supports EIA RS422/CCITT V.11 operation to a maximum of 64 Kbytes/s. For use on MicroVAX II BA23 systems. External cable not available from Digital.	KMV1A-EB
Supports EIA RS423/CCITT V.10 operation to a maximum of 19.2 Kbytes/s. For use on MicroVAX II BA123 systems. External cable is not available from Digital.	KMV1A-FA
Supports EIA RS423/CCITT V.10 operation to a maximum of 19.2 Kbytes/s. For use on MicroVAX II BA23 systems. External cable is not available from Digital.	KMV1A-FB

DHV11

The DHV11 is an eight-line, asynchronous, direct memory access multiplexer that provides local or remote interconnection between Q-bus PDP-11 and VAX systems and EIA RS-232-C/CCITT V.28 terminals or other systems. The DHV11 operates at program or jumper-selectable speeds of up to 38,400 bits per second in full-duplex, with full modem control on each line. Split-speed transmit and receive rates are supported on each line, making more efficient use of communications facilities by reducing the software demand for the receive line.

The DHV11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

DHV11 Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DHV11-AA
Includes module, internal cables I/O connection panel insert. For use on MicroVAX II BA23 systems.	DHV11-AB

DZQ11

The DZQ11 is a four-line, asynchronous multiplexer that provides local or remote interconnection between PDP-11 and VAX Q-bus systems and EIA RS-232-C/CCITT V.28 and EIA RS-423-A/CCITT V.10 terminals or other systems. The DZQ11 operates at program-selectable speeds of up to 9600 bits per second in full-duplex, with limited modem control on each line.

The DZQ11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

DZQ11 Order Codes

Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DZQ11-DA
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DZQ11-DB

DLVJ1

The DLVJ1 is a four-line, asynchronous interface that provides local or remote interconnection between Q-bus systems and EIA RS-232-C/CCITT V.28, EIA RS-422/CCITT V.11, and EIA RS-423/CCITT V.10 terminals. The DLVJ1 acts as four separate devices, making program operations more convenient than they are with a multiplexer. The DLVJ1 operates at program or jumper-selectable speeds from 150 to 38,400 bits per second in full-duplex. Limited modem control is included. Split-speed transmit and receive rates are supported on each line, making more efficient use of communications facilities by reducing the software demand for the receive line.

The DLVJ1 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

DLVJ1 Order Code

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. Four use with MicroVAX II BA123 systems.	DLVJ1-LA
Includes module, internal cables, and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DLVJ1-LB

DEQNA

The Ethernet-to-Q-bus, high-performance, synchronous communications controller (DEQNA) connects Q-bus PDP-11 and VAX systems to Ethernet local area networks (LANs). The DEQNA has FCC-certification, complies fully with the Ethernet specification, and operates at 10 Mbits per second.

The DEQNA provides Ethernet data link layer functions and a portion of the physical channel functions. The DEQNA is supported under DECnet Phase IV software. Digital also provides documentation and device drivers so that users can write their own higher-level protocols for specialized applications and communications in multivendor environments. The DEQNA allows communication with up to 1,023 addressable devices on an Ethernet. It physically and electrically connects to the Ethernet Coaxial Cable via Ethernet transceiver cables (BNE3C or BNE3A series) and a H4000 Ethernet Transceiver or a Local Network Interconnect (DELNI). The transceiver cable can be a maximum of 45 meters (148 feet) in length for BNE3X series transceiver cable, or 11.25 meters for BNE4X series transceiver cable.

DEQNA Order Code

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DEQNA-KA
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DEQNA-KB

DMV11

The DMV11 is a microprocessor-controlled, single-line, synchronous interface that provides local or remote interconnection between Q-bus systems and other computer systems with EIA-RS-232-C/CCITT V.28, CCITT V.35, or RS-423/RS-449 interfaces. The DMV11 implements DDCMP in hardware and supports direct memory access data transfers, DECnet point-to-point or multipoint configurations, and full-modem control. It operates at speeds from 19,200 bits per second to 56,000 bits per second (depending on the version selected) in half-duplex or full-duplex.

Depending on the operating system and layered software, the DMV11 can support up to 12 tributaries. In multipoint configurations, these tributaries can be other DMV11s or DMP11s. In point-to-point configurations, the DMV11 can communicate with other DMV11s, DMC11s, DUP11s, DPV11s, DMR11s, or DMP11s.

The DMV11 is compatible with Digital's family of modems and with Bell 200 series modems and their equivalents.

DMV11 Order Codes

Option	Order Code
RS-232-C	
RS-232-C interface. Includes module, internal cables and IO connection panel insert. For use on MicroVAX II BA123 systems.	DMV11-AX
RS-232-C interface. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DMV11-AW
RS-423/RS-449	
RS-423/RS-449 interface. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DMV11-FA
RS-423/RS-449 interface. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DMV11-FB
V.35	
V.35 interface. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 system. Includes a BC17E cable for connection to modem.	DMV11-BA
V.35 interface. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems. Includes a BC17E cable for connection to modem.	DMV11-BB
Integral Modem	
Integral modem. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DMV11-CA
Integral modem. Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DMV11-CB

DPV11

The DPV11 is a low-cost, single-line, synchronous, programmable interface that provides local or remote interconnection between Q-bus systems and other computer systems with EIA RS-232-C/CCITT V.28 or EIA RS-232-C/CCITT V.11 interfaces. It operates at speeds of up to 56,000 bits per second in half-duplex or full-duplex with full modem control. The DPV11 is programmable for either byte-oriented protocols (DDCMP or BISYNC) or bit-oriented protocols (SDLC or HDLC). The DPV11 is suited for interfacing to medium-speed synchronous lines for remote batch and remote job entry applications.

The DPV11 is compatible with Digital's family of modems and with the Bell 200 series modems and their equivalents.

DPV11 Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DPV11-AA
Includes module, internal cables and I/O connection panel insert. For use MicroVAX II BA23 systems.	DPV11-AB



Product Description

MicroVAX I is now being phased out and is available in strictly limited quantities

The MicroVAX I microcomputer system is the first member of Digital's 32-bit VAX family of computers systems, and is the first VAX configuration to use the extended Q-bus.

Engineered to perform a wide range of applications, including realtime applications, office automation, and general purpose programming, the MicroVAX I microcomputer gives you software compatibility with larger VAX systems. Any nonprivileged, native-mode program that runs on a VAX/VMS system will execute unmodified on a MicroVAX I microcomputer.

The MicroVAX I system can operate in any normal office environment – it doesn't need a special computer room. No special air conditioning is required. It is available in three versions – a rackmount version that fits in a standard 19-inch cabinet, a tabletop version that conveniently sits on top of a desk, or a floorstand model that fits easily under a desk or table. And the MicroVAX I system runs on standard 15-amp electrical lines. No special wiring is required.

The MicroVAX I microcomputer is customer installable and easy to operate. It has a rear I/O distribution panel that provides simple plug-in connectors for terminals, network interfaces, and other cables.

The MicroVAX I system can be part of a network by using an Ethernet Q-bus interface. Networking applications can be other MicroVAX I systems such as in an applications development environment, or departmental systems or VAXclusters that can be used for managerial applications and data collection, for example.

Eight new building block kernels with building block menus now make it possible to configure a wide range of MicroVAX I systems to meet customers' needs. The System Building Block (SBB) approach simplifies the task of configuring a MicroVAX I System by making it clear which components are required to yield a workable system.

Hardware

The MicroVAX I CPU consists of two quad-height modules that can be inserted into the Q/CD slots of the extended Q-bus backplane. They occupy adjacent slots and are connected together over the top with a special cable. The first board is a memory management and cache memory module that provides the logic to interface the extended Q-bus to the internal 32-bit VAX architecture. The second, the CPU module, provides the 32-bit data path, microsequencer, and control store.

The MicroVAX I microcomputer standard features:

- MicroVAX I native-mode instruction set
- Single- and double-precision (D__) or single and grand (G__) floating-point datatypes in firmware
- 8-slot extended Q-bus backplane
- 8-Kbyte I/O space
- Extended block mode transfer support
- 8-Kbyte direct-mapped cache
- 512-entry (longword) translation buffer
- 10-millisecond interval timer
- Console serial line
- 8-Kbyte boot ROM
- VAX ASCII console and TTY emulation
- Microverify self-test diagnostics
- Mass storage control protocol
- 230-watt switching power supply
- I/O distribution panel with inserts for expansion

The MicroVAX I microcomputer optional features:

- 2-Mbyte, 256-Kbyte, or 512-Kbyte parity MOS memory increments
- 11- or 31-Mbyte fixed Winchester disk subsystem
- RC25 26/26 Mbyte master drive, as an add-on device
- 2 x 400-Kbyte diskette subsystem
- Disk controller for both Winchester disk and diskette subsystems
- Ethernet Q-bus interface

Software

A realtime programming toolkit and two VAX-compatible virtual memory operating systems provide a range of VAX solutions for 32-bit microcomputer users. They are the following:

- **VAXELN**—A fully modular software system that lets programmers build dedicated, realtime applications on VAX/VMS development systems. The VAXELN toolkit uses the Pascal language and is layered on the VAX/VMS operating system as a development tool. After development, VAXELN applications run stand-alone on VAX or MicroVAX I target systems via the kernel executive.
- **MicroVMS**—A fully compatible modular version of the VAX/VMS operating system. The MicroVMS operating system can be used in both the general purpose multifunction and multiuser environments.
- **MicroVAX ULTRIX-32m** A stand-alone operating system based on the UNIXTM* (Berkeley Version 4.2) operating system for the multiuser development environment.

Please see the software section of this catalog for software layered products ordering information.

*UNIX is a trademark of AT&T Bell Laboratories.

Options Configuration Table

Option	Mounting Code	DC Amps Drawn		Watts	Bus Loads		Software Support ³		
		+ 5V	+ 12V		AC	DC	MicroVMS	ULTRIX-32m	VAXELN
MSV11-QA	Quad	2.80	N/A	14.0	2.0	1.0	yes	no	yes
MSV11-PK	Quad	3.45	N/A	17.3	2.0	1.0	yes	yes	yes
MSV11-PL	Quad	3.60	N/A	18.0	2.0	1.0	yes	yes	yes
DZQ11	Dual	0.90	0.35	8.7	1.0	1.0	yes	yes ²	yes
DEQNA	Dual	3.50	0.50	23.5	1.0	1.0	yes ¹	yes ¹	yes ¹
RQDX1-P	Quad	6.40	0.10	32.2	2.0	1.0	yes	yes	yes
RQDX1-E	Dual	0.50	-	2.5	-	-	yes	yes	yes
RD51-A	-	1.00	1.60	24.2	-	-	yes	yes	yes
RD52-A	-	1.50	2.50	37.5	-	-	yes	yes	yes
RX50-AA	-	0.85	1.80	25.9	-	-	yes	yes	yes
RC25 (controller)	Dual	3.00	-	15.0	2.0	1.0	check SPD	check SPD	yes

¹only one supported for each MicroVAX I system.

²only two supported for each MicroVAX I system.

³check appropriate Software Product Description for further details.

⁴Beginning and ending addresses must be specified to allow for other memory boards being addressed.

Country Kits

All MicroVAX I systems listed under Ordering Information come with English language documentation. The power cords are determined by the destination address of the system.

Power Supply

None of these limits may be exceeded. Full utilization of both + 5 and + 12 voltages is not allowed because that would exceed the 230-watt limit. The MicroVAX I power supply maximum outputs are

- 36 amps at + 5 Vdc
- 7 amps at + 12 Vdc
- dc power: 230 watts
- ac power: 320 watts

Backplane Slots

The MicroVAX I extended Q-bus backplane has a total of eight slots. The first two slots are reserved for the CPU and memory module. The remaining six slots can each accept one quad or two dual modules. These six slots can be used for memory and interface options. The third slot is occupied by memory, additional add-on memory would follow immediately after the third slot. If a double module is located between two quads, install the bus grant continuity card (G7272) in the A or C portion of the slot containing the double module.

I/O Distribution Panel Inserts

The I/O distribution panel on the MicroVAX I can support four 2- by 3-inch size B inserts, plus two 1- by 4-inch size A inserts. By removing the post shown in the System Configurators, two size B inserts plus five size A inserts can be accommodated. One size B is reserved for the CPU console terminal.

Configuring Information

Available power and backplane slots are the limiting factors in configuring MicroVAX I systems. As with other Q-bus systems, memory cards should immediately follow the CPU, then be followed by option cards in descending priority.

Diagnostic support is available for the DLVJ1, which is supported only as an OEM add-on device. It requires wire-wrap tools for proper configuring and violates the normal configuration rules. Driver not supplied with software.

Due to cabling restrictions, the RQDX1 controller must reside in the last occupied option slot. Only one RQDX1 can be installed in the MicroVAX I system. Because the RQDX1-E extender module does not use bus signals, it is placed behind the RQDX1 controller in the backplane.

The first MSV11-QA memory option draws 2.8 amps at +5 V. The second and subsequent options draw only 2.2 amps of “standby” power. This memory is compatible with all existing Digital Q-22 bus memories (MSV11-QB, MSV11-PL). The first MSV11-QB memory option draws 2.3 amps at +5 V. The second and subsequent options draw only 2.2 amps of standby power. The first MSV11-QC memory option draws 2.5 amps at +5 V.

One Mbyte of memory is required for systems running MicroVMS or ULTRIX-32m. A second megabyte of memory will improve performance. Four megabytes is the maximum memory allowed.

Unless the customer has a preference, it is recommended that all systems be sold with the D__ floating-point, which is compatible with Digital PDP-11 and VAX-11 systems.

Entry Level System

DISK UNIT #1

DISK UNIT #2

TOTAL

*Additional memory will increase performance

Four-Terminal System (Light Use)

1	TWO QUADS
2	KD32 CPU-MCT
3	KD32 CPU-DAP
4	QUAD
5	MSV11-QA 1 MB
6	DUAL DZQ11
7	QUAD
8	RQDX1 CONTROLLER

DISK UNIT #1

DISK UNIT #2

TOTAL

OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
		36		7		230		29
KD32-AA/AB	12.0	24.0	.5	6.5	66	164	4	25
MSV11-QA	2.8	21.2	—	6.5	14	150	2	23
DZQ11	.9	20.3	.35	6.15	8.7	141.3	1	22
RQDX1	6.4	13.9	.1	6.05	32.2	109.1	2.5	19.5
RX50	.85	13.05	1.8	4.25	25.9	83.2	—	19.5
RD52	1.5	11.55	2.5	1.75	37.5	45.7	—	19.5
		11.55		1.75		45.7		19.5

High Performance, Four-User, Networked System

1	TWO QUADS
2	KD32 CPU-MCT
3	KD32 CPU-DAP
4	QUAD
5	MSV11-QA 1 MB
6	QUAD
7	MSV11-QB 2MB
8	DUAL DEQNA
	DUAL DZQ11
7	QUAD
8	RQDX1 CONTROLLER

DISK UNIT #1

DISK UNIT #2

TOTAL

OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
		36		7		230		29
KD32-AA/AB	12.0	24.0	.5	6.5	66	164	4	25
MSV11-QA	2.8	21.2	—	6.5	14.0	150	2	23
MSV11-QA	2.2	19.0	—	6.5	11.0	139	2	21
DEQNA	3.5	13.3	.5	6.0	23.5	104.5	1	18
DZQ11	.9	12.4	.35	5.65	8.7	95.8	1	17
RQDX1	6.4	6.0	.1	5.55	32.2	63.6	2.5	14.5
RQDX1-E								
RX50	.85	5.15	1.8	3.75	25.9	37.7	—	14.5
RD52	1.5	3.65	2.5	1.25	37.5	.2	—	14.5
		3.65		1.25		.2		14.5

System with Disks and Memory (High Performance)

1	TWO QUADS
2	KD32 CPU-MCT
3	KD32 CPU-DAP
4	QUAD
5	MSV11-QA 1 MB
6	QUAD
7	MSV11-QC 4MB
8	QUAD
	RQDX1 CONTROLLER

DISK UNIT #1

DISK UNIT #2

TOTAL

OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
		36		7		230		29
KD32-AA/AB	12.0	24.0	.5	6.5	66	164	4	25
MSV11-QA	2.8	21.2	—	6.5	14	150	2	23
MSV11-QC	2.2	19	—	6.5	11	139	2	21
RQDX1	6.4	8.2	.1	6.4	32.2	84.8	2.5	14.5
RQDX1-E								
RX50	.85	7.35	1.8	4.6	25.9	58.9	—	14.5
RD52	1.5	5.85	2.5	2.1	37.5	21.4	—	14.5
		5.85		2.1		21.4		14.5

High Performance, Four-User, Networked System

1	TWO QUADS KD32 CPU-MCT KD32 CPU-DAP
2	
3	QUAD MSV11-QA 1 MB
4	QUAD MSV11-QA 1 MB
5	QUAD MSV11-QA 1 MB
6	DUAL DEQNA DUAL DZQ11
7	QUAD RQDX1 CONTROLLER
8	RQDX1-E

DISK UNIT #1

DISK UNIT #2

TOTAL

OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
		36		7		230		29
KD32-AA/AB	12.0	24.0	.5	6.5	66	164	4	25
MSV11-QA	2.8	21.2	—	6.5	14.0	150	2	23
MSV11-QB	2.2	19.0	—	6.5	11.0	139	2	21
MSV11-QA	2.2	16.8	—	6.5	11.0	128	2	19
DEQNA	3.5	13.3	.5	6.0	23.5	104.5	1	18
DZQ11	.9	12.4	.35	5.65	8.7	95.8	—	17
RQDX1	6.4	6.0	.1	5.55	32.2	63.6	2.5	14.5
RQDX1-E								
RX50	.85	5.15	1.8	3.75	25.9	37.7	—	14.5
RD52	1.5	3.65	2.5	1.25	37.5	2	—	14.5
TOTAL		3.65		1.25		2		14.5

Site Preparation

Rackmountable System

- Height: 13.3 centimeters (5.25 inches)
- Width: 48.3 centimeters (19 inches)
- Depth: 64.3 centimeters (25.3 inches)
- Weight: 24 kilograms (53 pounds)
- Required receptacle: NEMA #6-15R (240 Vac/50 Hz)

Floorstand System

- Height: 64.2 centimeters (24.5 inches)
- Width: 25.4 centimeters (10 inches)
- Depth: 72.6 centimeters (28.6 inches)
- Weight: 31.7 kilograms (70 pounds)
- Watts: 230
- Required receptacle: NEMA #6-15R (240 Vac/50 Hz)

Tabletop System

- Height: 17.7 centimeters (7 inches)
- Width: 56.2 centimeters (22.2 inches)
- Depth: 72.6 centimeters (28.6 inches)
- Weight: 29.5 kilograms (65 pounds)
- Watts: 230
- Required receptacle: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

SBB Component Order Codes

Option	Order Code
MicroVAX I CPU; 1-Mbyte MOS Memory (MSV11-QA), D__ floating-point, BA23-A mounting box and floor stand, bootstrap diagnostic ROM, and one asynchronous serial line (for connection to console terminal).	610QY-YB
Same as 610QY-YB, except rackmount	610QZ-YB
Same as 610QY-YB, except G__ floating point	610QY-YA
Same as 610QY-YB, except G__ floating point and rackmount	610QZ-YA
Same as 610QY-YB, except 512-Kbyte MOS memory (MSV11-PL)	610QY-XB
Same as 610QY-YB, except 512-Kbyte MOS memory (MSV11-PL) and rackmount	610QZ-XB
Same as 610QY-YB, except 512-Kbyte MOS memory (MSV11-PL) and G__ floating point	610QY-XA
Same as 610QY-YB, except 512KB MOS memory (MSV11-PL), G__ floating point and rackmount	610QZ-XA

It is mandatory that you select one (1) each from system device, load device and Software License (UZ or DZ). Selections from communication device, add-on device, console terminal, and software media (H3) menus are optional and must follow the guidelines specified. Check the appropriate SPD for software license guidelines.

Mass Storage Order Codes

System device (mandatory)	Load device (mandatory)	Order codes (mandatory)
RD51 11 Mbyte Winchester and Controller	RX50 Diskette	RD51-A, RQDX1, CK-RQDX1-KA, RX50-AA
RD52 31 Mbyte Winchester and Controller	RX50 Diskette	RD52-A, RQDX1, CK-RQDX1-KA RX50-AA

Optional Add-on Device
Order Codes

Option	Order Code
11-Mbyte Winchester, desk top and extender module	RD51-D and RQDX1-E
11-Mbyte Winchester, rackmount and extender module	RD51-R and RQDX1-E
31-Mbyte Winchester, desk top and extender module	RD52-DB and RQDX1-E
31-Mbyte Winchester, rackmount and extender module	RD52-RB and RQDX1-E
26/26-Mbyte master drive (single) and KLESI Q-bus adapter, desktop	RQC25-AB
26/26-Mbyte master drive (single) and KLESI Q-bus adapter, rackmount	RQC25-BB
26/26-Mbyte master drive and 26/26-slave and KLESI Q-bus adapter, rackmount	RQC25-CB
26/26-slave drive, desktop	RC25-DB
26/26-slave drive, rackmount	RC25-EB

**Optional Software License
Order Codes**

Option	Order Code
MicroVMS base system license and media	QN001-UZ QN001-H3
MicroVMS base system and development license media	QN002-UZ QN002-H3
VAXELN development license and media	QN375-UZ QN375-H3
VAXELN target license and media	QN376-DZ
DECnet end node license media	QND04-UZ QND04-H3
DECnet full function license and media	QND05-UZ QND05-H3
ULTRIX-32m single-user license with D__ float option and media	QN820-UZ QN820-H3
ULTRIX-32m multiuser (4) license with D__ float option and media	QN821-UZ QN821-H3
ULTRIX-32m single-user license with G__ float option and media	QN822-UZ QN822-H3
ULTRIX-32m multiuser (4) license with G__ float option and media	QN823-UZ QN823-H3

**Optional Communication Device
Order Codes**

Option	Order Code
4-line multiplexer (order with CK-DZQ11-DB)	DZQ11-M
8-line multiplexer	DHV11-AB
Ethernet controller	DEQNA-KB

**Optional Printer and Video Terminal
Order Codes**

Option	Order Code
Tabletop terminal	LA100-BA
Tabletop terminal	LA12-DB
Video terminal	VT101-AB
Alphanumeric video terminal	VT220-A3/B3/C3
Alphanumeric Video terminal	VT240-A2/B3/C3

**Configuring MicroVAX I System
Building Blocks**

Using System Building Blocks is very easy. First, choose a CPU kernel. Second, choose a disk, either an 11-Mbyte RD51 with an RX50 or a 31-Mbyte RD52 with an RX50. (The RX50 is required as a load/distribution device for software). Third, choose the software license and its distribution kit. (Check the appropriate Software Product Description for licensing and distribution media guidelines.) Communication Devices, add-on devices and console terminal are optional. However, a console device is required for MicroVMS or ULTRIX-32M systems.

*Typical System Building Block
Configurations*

**MicroVMS Development System,
Multiuser, with 3-Mbytes of Memory
and 31-Mbyte Hard Disk Order
Codes**

Option	Order Code
VAX SBB Kernel, 1 Mbyte, with D__ floating point	610QY-YB*
Additional 2 Mbytes of memory	MSV11-QB
Four-line multiplexer	DZQ11-DB
RD/RX disk controller	RQDX1 CK-RQDX1-KA
Dual 400-Kbyte floppy disk	RX50-AA
31 Mbyte Winchester disk	RD52-A
MicroVMS license (base plus development)	QN002-UZ
MicroVMS distribution (base plus development)	QN002-H3

*For the rackmount version, use 610QZ-YB.

**ULTRIX-32m Development System
for One to Four Users, with 3 Mbytes
of Memory and 31-Mbyte hard Disk
Order Codes**

Option	Order Code
VAX SBB Kernel, 1 Mbyte, with D__ floating point	610QY-YB*
Additional 2 Mbytes of memory	MSV11-QB
Four-line multiplexer	DZQ11-DB
RD/RX Disk Controller	RQDX1 CK-RQDX1-KA
Dual 400-Kbyte floppy disk	RX50-AA
31-Mbyte Winchester disk	RD52-A
ULTRIX-32m four-user system	QN821-UZ
ULTRIX-32m distribution kit	QN821-H3

*For the rackmount version, use 610QZ-YB

**MicroVMS Runtime System for
Eight Users (Software Developed on
another system), with 3 Mbytes of
Memory and 31-Mbyte Hard Disk
Order Codes**

Option	Order Code
VAX SBB Kernel, 1 Mbyte, with D__ floating point	610QY-YB*
Additional 2 Mbytes of memory	MSV11-QB
RD/RX disk controller	RQDX1 CK-RQDX1-KA
Dual 400-Kbyte floppy disk	RX50-AA
31 Mbyte Winchester disk	RD52-A
Ethernet controller	DEQNA-KB
MicroVMS base license plus development	QN002-UZ
MicroVMS distribution base license plus development	QN002-H3
VAXELN development kit license	QN375-UZ
VAXELN distribution kit	QN375-H3
DECnet MicroVAX license (end node)	QND04-UZ
DECnet MicroVAX distribution (end node)	QND04-H3

**VAXELN Target System
(Connected to Development System
Via Ethernet; Disk Is Optional
As Software Is Downline-loaded
from Host) Order Codes**

Option	Order Code
MicroVAX SBB Kernel, 1 Mbyte, with D__ floating point	610QY-YB†
Ethernet controller	DEQNA-KB
VAXELN target license‡	QN376-DZ

†For the rackmount version, use 610QZ-YB.

‡VAXELN runs well on 512-Kbyte systems, but for development it is wise to order more memory to allow for the debugger and other temporary software.

System Option Order Codes

Option	Order Code
1-Mbyte parity MOS memory	MSV11-QA
2-Mbyte parity MOS memory	MSV11-QB
512-Kbyte parity MOS memory	MSV11-PL

Please refer to the appropriate Q-bus options in Chapter 3 for additional MicroVAX options. Also, consult the Software section for layered software products and the software support of the hardware options.

Site Preparation Specifications

Rackmountable System

- Height: 13.3 cm (5.25 in)
- Width: 48.3 cm (19.0 in)
- Depth: 64.8 cm (25.5 in)
- Weight: 25.0 kg (55.0 lb)
- Maximum power consumption: 345 Watts
- Receptacles required: NEMA #6-15R (240 Vac/50 Hz)

Floorstand System

- Height: 62.2 cm (24.5 in)
- Width: 25.4 cm (10.0 in)
- Depth: 72.4 cm (28.5 in)
- Weight: 31.7 kg (70.0 lb)
- Maximum power consumption: 345 Watts
- Receptacles required: NEMA #6-15R (240 Vac/50 Hz)

Tabletop System

- Height: 15.2 cm (6.0 in)
- Width: 56.5 cm (22.25 in)
- Depth: 72.4 cm (28.5 in)
- Weight: 29.5 kg (65.0 lb)
- Maximum power consumption: 345 Watts
- Receptacles required: NEMA #6-15R (240 Vac/50 Hz)

MicroVAX I Upgrade

Ordering Information

MicroVAX I Upgrade Order Codes

Option

Order Code

MicroVAX II Upgrade Kit, CPU, FPU, 1-Mbyte memory, cabinet kit, disk controller, medallion, diagnostics, documentation, field service installation, MicroVMS upgrade license (one to eight user plus key)

630XR-AB

Same as 630XR-AB, except ULTRIX-32m upgrade license

630XR-AC

Same as 630XR-AB, except VAXELN runtime license

630XR-AD

MicroVMS Licenses

Ordering Information

MicroVMS License Order Codes

Option

Order Code

Upgrade from MicroVMS BASE or FULL license to MicroVMS one to eight-user license and key (RX50)

QZ002-C3

Upgrade from MicroVAX I to MicroVAX II ULTRIX-32m one to eight-user license

QZ833-UZ

Customers upgrading from MicroVAX I to MicroVAX II who have purchased the VAXELN run-time license will receive a new MicroVAX II run-time license.

System Options

MicroVAX I System Option Order Codes

Option

Order Code

512-Kbyte parity MOS memory.

MSV11-PL

1-Mbyte parity MOS memory

MSV11-QA

2-Mbyte parity MOS memory.

MSV11-QB

4-Mbyte parity MOS memory

MSV11-QC

RX50

The RX50 dual diskette drive can accommodate two diskettes simultaneously, one diskette can be used for system programs, and the other allocated as a file device. It stores data in fixed-length blocks on two 5.25-inch flexible diskettes using preformatted industry-standard headers. It has a peak transfer rate of 250,000 bits per second, an average seek time of 164 milliseconds and a rotational latency (average) of 100 milliseconds.

Media Characteristics

- Formatted capacity per diskette: 409 Kbytes (818 Kbytes total)
- Diskettes per drive: 2
- Recording surfaces per diskette: 1
- Bytes per sector: 512
- Sectors per track: 10
- Tracks per diskette: 80

RX50 Order Codes

Option	Order Code
0.8-Mbyte diskette drive (only).	RX50-AA

RD51

The RD51 is an 11-Mbyte, fixed disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing, which conforms to the industry standards for 5.25-inch disk media. The sealed head/disk assembly (HDA) contains two platters, four read/write heads and positioning arm. The sealed HDA helps to increase drive reliability and to ensure data integrity.

The RD51 has an average access time of 85 millisecond, a transfer rate of 5 Mbits per second (625 Kbytes per second) and an average rotational latency of 8.33 milliseconds.

Media Characteristics

- Formatted capacity: 11.059 Mbytes
- Recording surfaces (heads): 4
- Bytes per sector: 512
- Sectors per track: 18
- Track per drive: 1,200
- Recording method: modified frequency modulation (MFM)

RD51 Order Codes

Option	Order Code
System Option	
11-Mbyte Winchester disk drive	RD51-A
Factory Integrated Add-On Options	
11-Mbyte Winchester disk (RD51-D) and extender module, desktop.	RQDX1-EP
11-Mbyte Winchester disk (RD51-R) and extender module, rack mount.	RQDX1-EP
Field Add-On Options	
11-Mbyte Winchester disk (RD51-R), extender module, desktop (RQDX1-E) and cabinet kit.	CK-RQDXE-KA
11-Mbyte Winchester disk (RD51-R), extender module, rack mount (RQDX1-E) and cabinet kit.	CK-RQDXE-KA

The RD52 is a 31-Mbyte, fixed disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing that conforms to the industry standards for 5.25-inch disk media.

The RD52 has an average seektime of 49 milliseconds, transfer rate of 5 Mbits per second (625 Kbytes per second) and an average rotational latency of 8.50 milliseconds.

Media Characteristics

- Formatted capacity: 31 Mbytes
- Bytes per sector: 512
- Sectors per track: 16

RD52 Order Codes

Option	Order Code
System Option	
31-Mbyte Winchester disk drive	RD52-A
Factory Integrated Add-On Options	
31-Mbyte Winchester disk (RD52-DA/DB) and extender module, desktop.	RQDX1-EP
31 Mbyte Winchester disk (RD52-DA/DB) and extender module, rack mount.	RQDX1-EP
Field Add-On Options	
31-Mbyte Winchester disk (RD52-DA/DB), extender module (RQDX1-E) and cabinet kit.	CK-RQDXE-KA
31-Mbyte Winchester disk (RD52-DA/DB), extender module (RQDX1-E) and cabinet kit.	CK-RQDXE-KA

RC25

The RC25 is an intelligent storage subsystem containing a 26 MB removable front loading cartridge and a 26MB fixed disk on the same spindle. The master RQC25 subsystem includes a controller, bus adaptor for the Q-bus, cartridge, power supply and a set of cables. A second RC25 can be added to the master (slave). Programs in the host system communicate with the subsystem using the Mass Storage Control Protocol (MSCP) of the Digital Storage Architecture. Features include exceptional performance, data reliability and integrity. The subsystem has a powerful 170 bit error detection and correction code, seek ordering, overlapped seeks and bad block replacement. The drive comes in both rack mounted and table top versions.

RC25 Order Codes

Option	Order Code
Factory Integrated Add-On	
Master table-top drive (single) plus KLESI Q-bus adapter	RQC25-AB
Factory Integrated Add-On	
Master 26/26 rackmounted drive plus KLESI Q-bus adapter	RQC25-BB
Dual rackmounted drive (master 26/26 plus slave 26/26) plus KLESI Q-bus adapter	RQC25-CB
Slave 26/26 table-top drive	RC25-DB
Slave 26/26 rack-mounted drive	RC25-EB

RQDX1

The RQDX1 controller is used to interface the 11-Mbyte RD51 or the 31-Mbyte Winchester disk drives and the RX50 0.8 Mbyte diskette drives to the Q-bus. Data transfer to the host system is via efficient block-mode DMA. The RQDX1 is an intelligent controller with an on-board microprocessor. Programs in the host system communicate with the controller and drives using the Mass Storage Control Protocol (MSCP) of the Digital Storage Architecture. MSCP and the RQDX1 include features to enhance system throughput, ensure data integrity, and increase subsystem availability.

An RQDX1 can control a maximum of four drives. Each RD51 or RD52 disk counts as one drive, with a maximum of two RD51 or RD52 units per controller. Each RX50 counts as two drives.

The extender (RQDX1-E) module is a dual-height module (M7512) and uses one Type A (one by four inch) Distribution Insert Panel.

Ordering Information

RQDX1 Order Codes

Option	Order Code
Q-bus controller for RX50/RD51 or RX50/RD52.	RQDX1-P
Extender module for RD51 or RD52	RQDX1-E
Factory integrated extender module	RQDX1-EP
Cabinet kit for MicroVAX (BA23) box	CK-RQDX1-KA

DHV11

The DHV11 is an eight-line, asynchronous, direct memory access multiplexer that provides local or remote interconnection between Q-bus PDP-11 and VAX systems and EIA RS-232-C/CCITT V.28 terminals or other systems. The DHV11 operates at program or jumper-selectable speeds of up to 38,400 bits per second in full-duplex, with full modem control on each line. Split-speed transmit and receive rates are supported on each line, making more efficient use of communications facilities by reducing the software demand for the receive line.

The DHV11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

Ordering Information

DHV11 Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DHV11-AA
Includes module, internal cables I/O connection panel insert. For use on MicroVAX II BA23 systems.	DHV11-AB

DZQ11

The DZQ11 is a four-line, asynchronous multiplexer that provides local or remote interconnection between PDP-11 and VAX Q-bus systems and EIA RS-232-C/CCITT V.28 and EIA RS-423-A/CCITT V.10 terminals or other systems. The DZQ11 operates at program-selectable speeds of up to 9600 bits per second in full-duplex, with limited modem control on each line.

The DZQ11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

Ordering Information

DZQ11 Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DZQ11-DA
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DZQ11-DB

DEQNA

The Ethernet-to-Q-bus high performance synchronous communications controller (DEQNA) connects Q-bus PDP-11 and VAX systems to Ethernet Local Area Networks (LANs). The DEQNA has FCC-certification, complies fully with the Ethernet specification and operates at 10 mbits per second.

The DEQNA provides Ethernet data link layer functions and a portion of the physical channel functions. The DEQNA is supported under DECnet Phase IV software. Digital also provides documentation and device drivers so that users can write their own higher-level protocols for specialized applications and communications in multivendor environments. The DEQNA allows communication with up to 1,023 addressable devices on an Ethernet. It physically and electrically connects to the Ethernet Coaxial Cable via Ethernet transceiver cables (BNE3C or BNE3A series) and a H4000 Ethernet Transceiver or a Local Network Interconnect (DELNI). The transceiver cable can be a maximum of 45 meters (148 feet) in length for BNE3X series transceiver cable, or 11.25 meters for BNE4X series transceiver cable.

Ordering Information

DEQNA Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA123 systems.	DEQNA-KA
Includes module, internal cables and I/O connection panel insert. For use on MicroVAX II BA23 systems.	DEQNA-KB

Introduction

A VAXcluster consists of one or more VAX-11/750, VAX-11/780, VAX-11/785 or VAX 8600 processors running on VAX/VMS connected by a high-speed bus (computer- interconnect), one or more mass storage servers (HSC50), and communication links to the user community. Each cluster element connected to the high-speed bus is referred to as a cluster node. Cluster nodes interconnect via a SC008-AC star coupler. The maximum distance between the SC008 star coupler and any node is 45 meters.

There are two types of VAXcluster System Building Blocks. The first type is a basic system element consisting of a single VAX-11/750, VAX-11/780, or VAX-11/785 with 4 Mbytes of 64-K chip ECC MOS memory or a VAX 8600 with 12 Mbytes of ECC MOS memory, with the following cluster components; CI750 or CI780 computer- interconnect (bandwidth 70 Mbits per second), SC008-AC star coupler, HSC50 intelligent I/O server, and one (HSC5X-BA) disk interface (with four ports), plus a VAX/VMS operating system license and a DECnet routing license. In addition there are two dual cluster System Building Blocks, the VAX-11/785 and VAX-11/750 Minincluster, which contain the cluster components listed above.

The second type of Cluster System Building Block is an upgrade to an existing VAXcluster. If a VAXcluster with an HSC50 and a star coupler is already ordered or installed, select from a VAXcluster Upgrade Building Block Menu. The upgrade consists of a VAX-11/750, VAX-11/780, or VAX-11/785 CPU with 4 Mbytes of 64-K chip ECC MOS memory or VAX 8600 with 12 Mbytes of ECC MOS memory, CI750 or CI780 computer-interconnect, a VAX/VMS operating system license, and DECnet routing license. An LA120 or LA100 console terminal (an LA12 may be selected for the VAX-11/750) must be ordered.

Introduction

Digital's VAX 8600 computer system is the high-end member of the VAX family of computers. These high-performance systems implement the VAX architecture, making them software compatible with all other VAX systems. The central processor uses 32-bit architecture with 4 gigabytes of virtual addressing space.

The VAX 8600 CPU features virtual memory management, bootstrap loader, standard instructions for packed decimal, floating (F, D, G and H data types) and fixed point arithmetic, character and string manipulations, 16Kbyte write back cache memory, high-precision programmable realtime clock, time-of-year clock with battery backup, and 8K words (86-bit words) of writable control store. Standard with the VAX 8600 is a DF112 modem for remote diagnosis. The CPU also includes a Console Subsystem which comprises an RL02 disk drive, DCT11 microcomputer, console terminal and remote diagnostic port. (Console terminal not included, must be selected from menu.)

The VAX 8600 preconfigured VAXcluster System Building Block features a built-in computer interconnect (CI780), an Ethernet communications controller (DEUNA), a DMF32 multi-purpose communications controller, and four DMZ32-M asynchronous multiplexers.

The VAX 8600 system is supported by the VMS operating system. VMS provides a reliable, high-performance environment for the concurrent execution of multiuser timesharing, batch and realtime applications.

Configuration

VAX 8600 VAXcluster System Configuration

The VAX 8600 preconfigured VAXcluster System Building Block consists of one CPU cabinet, a CPU Front End Cabinet, a Star Coupler cabinet and an HSC50 cabinet.

VAX 8600 VAXcluster Upgrade Configuration

The VAX 8600 preconfigured VAXcluster Upgrade consists of one CPU cabinet, and a CPU Front End Cabinet.

Hardware

CPU Cabinet

Both the VAXcluster System and Upgrade CPU cabinet contain the processor, a memory controller with 12-Mbytes of ECC MOS memory, one DW780 UNIBUS adapter, one CI780 computer interconnect, one FP86 floating-point accelerator, one DB86 SBI adapter, one DCT11 microcomputer, power supplies, and the Environmental Monitoring Module. Memory can be expanded to 32 Mbytes in the CPU cabinet.

There is dedicated space within the CPU cabinet for a second DW780 UNIBUS Adapter and a second DB86 SBI Adapter.

CPU Front End Cabinet

Both the VAXcluster System and Upgrade CPU Front End Cabinet contain the console RL02 disk, four DMZ32 asynchronous multiplexers, one DMF32 communications controller and one DEUNA Ethernet-to-UNIBUS controller. Four I/O connection panels units are allocated for the connection of the CK-DMZ32 distribution panel cables.

There is no further expansion available in the CPU Front End Cabinet.

DMF32 Communications Controller

The DMF32 has available eight asynchronous communications lines, one synchronous line, and one parallel interface for connection of a lineprinter or user-developed device.

DMZ32-M Communications Controllers

Utilization of the four DMZ32s requires the purchase of a CK-DMZ32 distribution panel for each of the DMZ32-Ms. The DMZ32 distribution panels are stand-alone units that can be mounted in any 19-inch cabinet. They are available with or without modem control (see Communications Options). Each optional CK-DMZ32 distribution panel supports 24 asynchronous communications lines.

DEUNA Communications Interface

The Ethernet-to-UNIBUS high performance synchronous communications controller (DEUNA) connects VAX systems to Ethernet Local Area Networks (LANs). The DEUNA operates at 10 Mbits per second. The DEUNA provides Ethernet data link layer functions and a portion of the physical channel functions. The DEUNA is supported under DECnet Phase IV software. It physically and electrically connects to the Ethernet coaxial cable via Ethernet transceiver cables (BNE3C or BNE3A series) and an H4000 Ethernet Transceiver or a Local Network Interconnect (DELNI). The transceiver cable can be a maximum of 40 meters (131 feet) in length for BNE3x series transceiver cable, or 10 meters for BNE4x series transceiver cable.

VAXcluster System Star Coupler Cabinet

The Star Coupler Cabinet contains an eight-node dual path computer interconnect assembly. Two nodes are used for the CI780 and the HSC50, leaving six nodes available for expansion. With the addition of a SC008-AD the SC008-AC can be expanded to accommodate eight more nodes for a total of 16.

VAXcluster System HSC50 Intelligent I/O Server Cabinet

Includes one HSC5X-BA interface that supports up to four disk devices (RA80, RA81, or RA60 in any combination). Also includes one HSC5X-CA interface that supports up to four TA78 tape units. There is expansion space available for up to four additional HSC5X disk or tape interfaces. Any expansion over three HSC5X-xx requires a second power supply (HSC5X-EB).

CI780 Computer Interconnect Cabling

Two sets of 20 meter dual path computer interconnect cables (eight cables) are included that connect the CI780 and the HSC50 to the Star Coupler cabinet.

VAX 8600 Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable:

CPU Options

- CPU memory may be expanded to 32 MB with the addition of MS86-BA ECC MOS memory in four Mbyte increments.
- DW780-MB UNIBUS Adapter (one per CPU cabinet, see also SBI expansion).
- DB86 Second SBI Adapter (see SBI Expansion).

UNIBUS Expansion:

For further UNIBUS expansion a DW780-MB, H9652-F, BA11-A and DD11-DK are required (see also SBI Expansion).

SBI Expansion:

Choose *one* of the following two ways to utilize the SBI expansion capabilities of the VAX 8600.

(1) To extend the included SBI interface, order one H9652-C SBI Expansion cabinet (providing four OPS).

or

(2) Order the optional second SBI adapter (DB86) and up to two H9652-C SBI Expansion cabinets (providing four OPS each).

Up to eight adapters (for a system maximum of eleven) may be connected to this second SBI as follows: up to two CI780 (only one CI780 if a DR780 is also connected), up to four DR780 (only one DR780 if a CI780 is also connected), up to four RH780, and up to four DW780.

Communications Options

Maximums are dependent on total communications requirements and other considerations. Consult the VAX/VMS SPD for details.

- Asynchronous Interfaces—DZ11, DZ32, DHU11, DMF32, DMZ32
- Communications Interfaces—DEUNA, DMP11, DMR11, DR11, DUP11

Mass Storage

HSC50

- Four TA tapes per HSC5X-CA
- Four RA disks per HSC5X-BA
- Four additional HSC5X disk or tape interfaces (expansion over three interfaces requires second power supply)

UNIBUS

- One UDA50 disk controller supporting up to four of any combination of RA60, RA80 and RA81 disk drives.
- RL02 Cartridge Disks (one RL211 subsystem per system)
- TU81 magnetic tape (one subsystem per UNIBUS)

MASSBUS

- On the included SBI a total of four MBAs are allowed, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported MASSBUS devices: REM05 disk subsystems; TEE16, TEU77 and TEU78 tape subsystems.

Input/Output

- System Printers (16 per system, total)
- Terminals, equal to the number of DMZ32, DMF32, DZ32, DHU11, and/or DZ11 communication lines (not a system maximum or requirement—see the VAX/VMS SPD for details)
- Terminals connected to Ethernet Terminal Servers (DECSA or LAT-11)

A fully supported system is configured by selecting at least one each from the System device, Load device, Communications device and Console Terminal menus. You may select one or more items from the Software menu. If your order disregards the menu selection process then the system may not be fully supported, in this case you should refer to the Sales Administration process for non-standard orders.

- 12-MB ECC MOS Memory
- FP86-AA floating-point accelerator
- CI780-MA Computer Interconnect
- SC008-AC Star Coupler
- H9652-FB UNIBUS Expander Cabinet
- HSC50-AB Intelligent I/O Controller
- HSC5X-BA Interface (supporting up to four RA disks)
- HSC5X-CA Interface (supporting up to four TA tapes)
- DB86-AA First SBI Adapter
- DW780-MA First UNIBUS Adapter
- BA11-AM Expansion Box
- DD11-DK 9-slot UNIBUS Backplane
- DMZ32 24-line Multiplexer
- DMF32-LE Multipurpose Communications Controller†
- DEUNA-AA Ethernet Communications Controller‡
- Two BNCIA-20 20 meter (60 foot) cables (total of eight cables)
- QK001-UZ VMS Operating System License
- QKD05-UZ DECnet-VAX Full Function License

†Choose appropriate communications cables and CK-DMZ32 distribution panel as required.
‡PCXXF-CK console stand recommended.

Mass Storage Order Codes

System Device	Load Device
	PE = 1600, GCR = 6250
	TA78 PE/GCR Tape
RA60 205 MB (Rem)	RA60-CD TA78-BJ
RA81 456 MB (Fixed)	RA81-CD TA78-BJ
RA81 1,368 MB (Fixed)	RA81-ED TA78-BJ

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
<i>Software license for DSRVA</i>	<i>QK925-UZ</i>
<i>Media and documentation for DSRVA</i>	<i>QK925-HM</i>
<i>Country kit for DSRVA</i>	<i>DSRVK-A*</i>
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
<i>Software license for DECSA-CA or -DA</i>	<i>QK726-UZ</i>
<i>Media and Documentation for DECSA-CA or -DA</i>	<i>QK726-HM</i>
<i>Country kit for DECSA</i>	<i>DECSK-A*</i>

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes

Tabletop Terminal‡	LA100-BB
Hardcopy terminal	LA120-DA

Software and Service Order Codes†

VAX/VMS media and documentation (H-kit) on 9-track tape	QK001-HM
DECnet-VAX full function media and documentation (H-kit) on 9-track tape	QKD05-HM
2-CPU cluster OSSP 2 (some VMS experience)	QK025-7M
2-CPU cluster OSSP 3 (no VMS experience)	QK025-BM
2-CPU cluster OSSP 2 (high VMS experience)	QK026-7M

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

A fully supported system is configured by selecting at least one each from the System device, Load device, Communications device and Console Terminal menus. You may select one or more items from the Software menu. If your order disregards the menu selection process then the system may not be fully supported, in this case you should refer to the Sales Administration process for non-standard orders.

- 12-MB ECC MOS Memory
- FP86-AA floating-point accelerator
- CI780-MA Computer Interconnect
- Four DMZ32 DMA Modules
- DB86-AA First SBI Adapter
- DW780-MA First UNIBUS Adapter
- BA11-AM Expansion Box
- DD11-DK 9-slot UNIBUS Backplane
- H9652-FB UNIBUS Expander Cabinet
- DMF32-LE Multipurpose Communications Controller
- DEUNA-AA Ethernet Communications Controller
- One BNCIA-20 20 meter (60 foot) cable (total of four cables)
- QK001-UZ VMS Operating System License
- QKD05-QZ DECnet-VAX Full Function VAXcluster License

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

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F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes**Tabletop Terminal****LA100-BB**



Software and Service Order Codes†

VAX/VMS Media and Documentation (H-kit) on 9-track tape	QK001-HM
DECnet-VAX full function Media and Documentation (H-kit) on 9-track tape	QKD05-HM
Cluster Node OSSP 2 (some VMS experience)	QK025-7Z
Cluster Node OSSP 3 (no VMS experience)	QK025-BZ
Cluster Node OSSP 2 (high VMS experience)	QK025-7Z

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

VAX 8600 VAXcluster System Configuration

The VAX 8600 preconfigured VAXcluster System Building Block consists of one CPU cabinet, a CPU Front End Cabinet, a Star Coupler cabinet and an HSC50 cabinet.

VAX 8600 VAXcluster Upgrade Configuration

The VAX 8600 preconfigured VAXcluster Upgrade consists of one CPU cabinet and a CPU Front End cabinet.

CPU Cabinet

Both the VAXcluster System and Upgrade CPU cabinet contain the processor, a memory controller with 8 Mbytes of ECC MOS memory, one DW780 UNIBUS adapter, one CI780 computer interconnect, and one DB86 SBI adapter. Memory can be expanded to 32 Mbytes in the CPU cabinet.

There is dedicated space within the CPU cabinet for one FP86 floating-point processor, one RB86 controller, a second DW780 UNIBUS adapter and a second DB86 SBI Adapter.

CPU Front End Cabinet

Both the VAXcluster System and Upgrade CPU Front End Cabinet contain the console RL02 disk and a BA11 UNIBUS Expansion box.

UNIBUS Expander Box

The UNIBUS Expander Box contains two DD11-DKs and one DD11-CK for a total of five useable system units. One additional system unit is reserved for the RLV12 controller. The BA11-A box is expandable to another UNIBUS cabinet.

VAXcluster System Star Coupler

The Star Coupler Cabinet contains an eight-node dual path computer interconnect assembly. Two nodes are used for the CI780 and the HSC50, leaving six nodes available for expansion. With the addition of a SC008-AD the SC008-AC can be expanded to accommodate eight more nodes for a total of 16.

VAXcluster System HSC50 Intelligent I/O Server Cabinet

Includes one HSC5X-BA interface that supports up to four disk devices (RA80, RA81, or RA60 in any combination). Also includes one HSC5X-CA interface that supports up to four TA78 tape units. There is expansion space available for up to four additional HSC5X disk or tape interfaces. Any expansion over three HSC5X-xx requires a second power supply (HSC5X-EB).

CI780 Computer Interconnect Cabling

Two sets of 20 meter dual path computer interconnect cables (eight cables) are included. These cables connect the CI780 and the HSC50 to the Star Coupler cabinet.

VAX 8600 Add-On Options

The following CPU, communications, mass storage, input/output, and expansion cabinet options are allowed, with maximum quantities for each option in parentheses where applicable:

- CPU memory may be expanded to 32 MB with the addition of MS86-BA ECC MOS memory in four Mbyte increments.
- FP86-AA floating-point accelerator (dedicated space, one per system).
- RB86-AA controller (dedicated space, one per system).
- DW780-MB UNIBUS Adapter (one per CPU cabinet, see also SBI expansion).
- DB86 Second SBI Adapter (see SBI Expansion).

UNIBUS Expansion:

For further UNIBUS expansion a DW780-MB, H9652-F, BA11-A and DD11-DK are required (see also SBI Expansion).

SBI Expansion:

Choose one of the following two ways to utilize the SBI expansion capabilities of the VAX 8600.

(1) To extend the included SBI interface, order one H9652-C SBI Expansion cabinet (providing four OPS).

or

(2) Order the optional second SBI adapter (DB86) and up to two H9652-C SBI Expansion cabinets (providing four OPS each).

Up to eight adapters (for a system maximum of eleven) may be connected to this second SBI as follows: up to two CI780 (only one CI780 if a DR780 is also connected), up to four DR780 (only one DR780 if a CI780 is also connected), up to four RH780, and up to four DW780.

Communications

Maximums are dependent on total communications requirements and other considerations. Consult the *VAX/VMS SPD* for details.

- Asynchronous Interfaces—DHU11, DMF32, DMZ32
- Communications Interfaces—DEUNA, DMP11, DMR11, DR11-W, DUP11

Mass Storage

HSC50

- Four TA tapes per HSC5X-CA
- Four RA disks per HSC5X-BA
- Four additional HSC5X disk or tape interfaces (expansion over three interfaces requires second power supply)

UNIBUS

- UDA50 disk controllers, each supporting up to four of any combination of RA60, RA80, and RA81 disk drives. One UDA50 is allowed and supported on the *first* UNIBUS. Other options may be placed on the same UNIBUS with the exception of the DR11-W, PCL11, VS100, VS11, or any other graphic terminal. Adding a second UDA50 requires a second UNIBUS, BA11-K and DD11-DK. With the exception of the first UNIBUS, a maximum of two UDA50s per UNIBUS are supported. If two UDA50s are on a UNIBUS, then no other options can be placed on that UNIBUS.
- RL02 Cartridge Disks (one RL211 subsystem per system)
- TU81 magnetic tape (four subsystems per UNIBUS)

MASSBUS

- On the included SBI a total of four MBAs are allowed, each requiring one OPS.
- A total of eight MASSBUS devices (disks or tape formatters in any combination) per MBA. Supported MASSBUS devices: REM05 disk subsystems; TEE16, TEU77 and TEU78 tape subsystems.

Input/Output

- System Printers (16 per system, total)
- Terminals, equal to the number of DMZ32, DMF32, and/or DHU11 communication lines (not a system maximum or requirement—see the *VAX/VMS SPD* for details)
- Terminals connected to Ethernet Terminal Servers (DECSA or LAT-11)

VAX 8600 VAXcluster System

861CA-AJ

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- First SBI adapter
- First UNIBUS adapter
- UNIBUS expander cabinet
- BA11 expansion box
- 9-slot UNIBUS backplane
- 8-MB ECC MOS Memory
- CI780-MA Computer Interconnect
- SC008-AC Star Coupler
- HSC50-AB Intelligent I/O Controller
- HSC5X-BA Interface (supporting up to four RA disks)
- HSC5X-CA Interface (supporting up to four TA tapes)
- Two BNCIA-20 20 meter (60 foot) cables (total of eight cables)
- VMS Operating System License
- DECnet-VAX Full Function License

Mass Storage Order Codes

System Device	Load Device
	Disk/Tape (PE = 1600, GCR = 6250)
	TA78 PE/GCR Tape
RA60 205 MB (Rem)	RA60-CD TA78-BJ
RA81 456 MB (Fixed)	RA81-CD TA78-BJ
RA81 1,368 MB (Fixed)	RA81-ED TA78-BJ

Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/ language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		



Console Terminal Order Codes	Hardcopy Terminal†	LA100-BB
	Hardcopy Terminal	LA120-DA

‡PCXXF-CK console stand recommended.

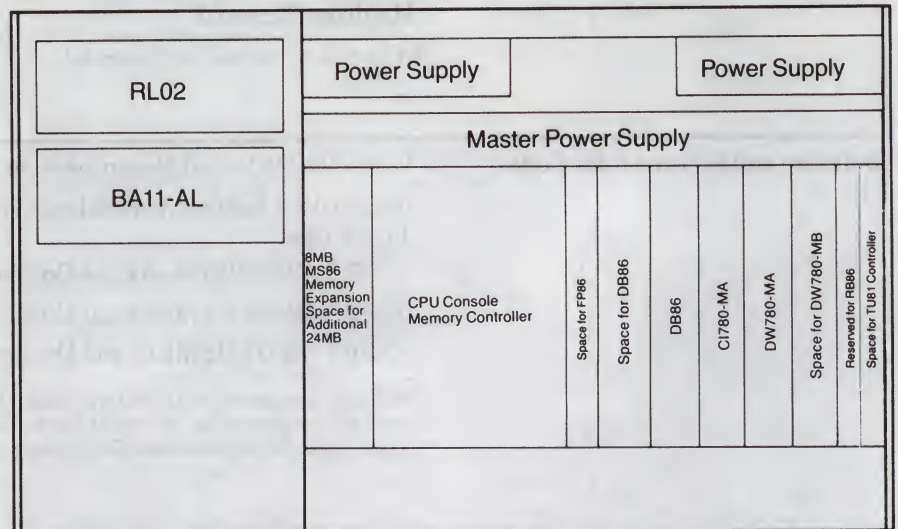


Software and Service Order Codes†	VAX/VMS Media and Documentation (H-kit)	QK001-HM
	DECnet-VAX full function media and documentation on 9-track tape	QKD05-HM
	OSSP 2, VAX/VMS Media and Documentation	QK025-7M
	OSSP 3, VAX/VMS Media and Documentation	QK025-BM
	OSSP 2, VAX/VMS Media and Documentation	QK026-7M

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

VAX 8600 CPU Cabinet

Front End Cabinet



VAX 8600 VAXcluster Upgrade**861CA-AT**

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- First SBI adapter
- First UNIBUS adapter
- UNIBUS expander cabinet
- BA11 expansion box
- 9-slot UNIBUS backplane
- 8-MB ECC MOS Memory
- CI780-MA Computer Interconnect
- One BNCIA-20 20 meter (60 foot) cable (total of four cables)
- VMS Operating System License
- DECnet-VAX Full Function VAXcluster License

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes

Tabletop Terminal	LA100-BB
Hardcopy Terminal	LA120-DA

Software and Service Order Codes

VAX/VMS Media and Documentation (H-kit)	QK001-HM
DECnet-VAX full function media and documentation on 9-track tape	QKD05-HM
OSSP 2, VAX/VMS Media and Documentation	QK026-7Z
OSSP 2, VAX/VMS Media and Documentation	QK025-BZ
OSSP 3, VAX/VMS Media and Documentation	QK025-7Z

Information*VAX-11/785 VAXcluster
System Configuration*

The VAX-11/785 VAXcluster System Building Block consists of one CPU cabinet, one UNIBUS expansion cabinet, a star coupler cabinet and an HSC50 cabinet.

*VAX-11/785 VAXcluster
Upgrade Configuration*

The VAX-11/785 VAXcluster Upgrade consists of one CPU cabinet, and one UNIBUS expansion cabinet.

Hardware*CPU Cabinet*

The CPU cabinet contains local memory, one DW780 UNIBUS adapter, a CI780 computer interface, and one option panel space (OPS).

VAX-11/785 Memory

CPU memory can be expanded to 16 Mbytes with the addition of MS780-E/F 64-K chip ECC MOS memory. An additional 16 Mbytes of MS780-E ECC MOS 64-K chip expansion memory can be added in a CPU expander cabinet (H9652-H) for a system total of 32 Mbytes. Additional multiport memory can also be added.

UNIBUS Expansion Cabinet

The UNIBUS expansion cabinet contains one BA11-K expansion box with a DD11-DK expansion backplane, providing seven Hex and two Quad slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11-K expansion box or two 26.6-centimeter (10.5-inch) rack-mounted options.

There are ten groups of four (2.2 inch wide by 4.7 inch high) panel units available in the UNIBUS expansion cabinet I/O connection panel. Due to cable space limitations, a maximum of 32 of these panel units is available for multiplexed communications lines (DHU11, DMZ32, DZ11, and DMF32). The remaining eight panel units are available for the connector inserts to other options. Available panel units are reduced to 32 when the cabinet is configured with one 26.6-centimeter (10.5-inch) rack-mounted option. Available panel units are reduced to 24 when the cabinet is configured with two 26.6-centimeter (10.5-inch) rack-mounted options (not two RA series disks). These panel units can be used for any type of option.

Star Coupler Cabinet

The star coupler cabinet contains an eight-node dual-path computer-interconnect assembly. Two nodes are used for the CI780 and the HSC50, leaving six nodes available for expansion. With the addition of an SC008-AD, the SC008-AC can be expanded to accommodate eight more nodes for a total of 16.

HSC50 Intelligent I/O Server Cabinet

This cabinet includes one HSC5X-BA interface for up to four disk devices (RA80, RA81, or RA60) in any combination. There is expansion space available for up to five additional HSC5X interfaces, providing for a total of 24 disk or tape (formatters) device interfaces.

CI780 Cabling

Two sets of 20-meter dual-path computer interconnect cables (eight cables) connect the CI780 and the HSC50 to the star coupler cabinet.

CPU Options

- H7112 memory battery backup (dedicated space in cabinet, one per memory controller).
- MA780 multiport memory controllers (two per system).
- FP785 floating-point accelerator (dedicated space, one per system).
- DW780 UNIBUS adapter or MASSBUS adapter (four per system total).
- Remote diagnosis feature with Field Service contract.

VAX-11/785 VAXcluster System**785CC-AJ**

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbyte (64-K chip) ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- CI780-AB computer interconnect
- SC008-AC star coupler
- Two BNCIA-20 20-meter (60-foot) CI cables
- HSC50-AB intelligent I/O controller
- HSC5X-BA interface (four RA disk ports)
- QE001-UZ VAX/VMS license and warranty
- QED05-UZ DECnet license

Mass Storage Order Codes

System Device	Load Device Disk/Tape (PE = 1600 b/in, GCR = 6,250 b/in)		
	RA60 205 MB (Removable Disk)	TU81 Magtape (PE/GCR)	TA78 Magtape (PE/GCR)
RA60 205 MB (Removable Disk)	RA60-CD RA60-AA	RA60-CD TU81-AB	RA60-CD TA78-BJ
RA81 456 MB (Fixed Disk)	RA81-AD RA60-CD	RA81-AD TU81-AB	RA81-CD TA78-BJ
RA81 1,368 MB (3-Fixed Disks)	RA81-ED RA60-CD	RA81-ED TU81-AB	RA81-ED TA78-BJ

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

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F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes	Hardcopy terminal	LA100-BB
	Hardcopy terminal	LA120-DA
▼		
Software and Service Order Codes†	VAX/VMS media and documentation (H-kit)	QE001-H‡
	DECnet-VAX full function media and documentation (H-kit) on RX01 floppy disk	QE005-HY
	2-CPU cluster OSSP 2 (some VMS experience)	QE025-7‡
	2-CPU cluster OSSP 3 (no VMS experience)	QE025-B‡
	2-CPU cluster OSSP 2 (high VMS experience)	QE026-7‡

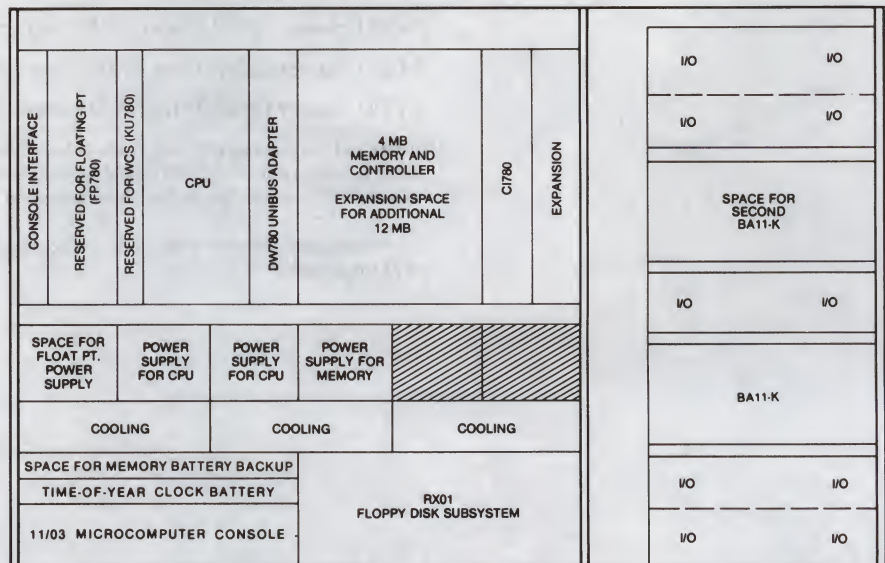
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

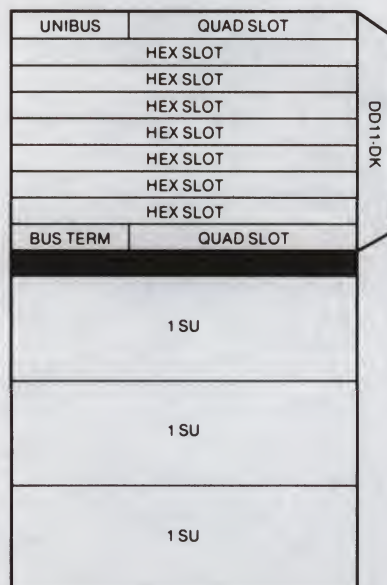
VAX-11/785 CPU
 UNIBUS Expansion Cabinet
 Star Coupler Cabinet
 HSC50 Cabinet



VAX-11/785 CPU Cabinet
 UNIBUS Expansion Cabinet
 (Rear View)



BA11-KU(KV) Expansion Mounting
 Box with DD11-DK Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
BA11-K Box		4.0	10.0	19.0
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0			
SU 3-5: 3 SUs	32.0			

System Upgrade

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbyte (64-K chip) ECC MOS memory
- H9652-MH UNIBUS expansion cabinet with BA11-KV and DD11-DK
- CI780-AB computer interconnect
- One BNCIA-20 20-meter (60-foot) CI cable (total of four cables)
- QE001-UZ VAX/VMS license and warranty
- QED05-QZ DECnet VAXcluster license

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120 DA

Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QE001-H‡
DECnet-VAX full function media and documentation (H-kit) on RX01 floppy disk	QED05-HY
Cluster node OSSP 2 (some VMS experience)	QK025-7Z
Cluster node OSSP 3 (no VMS experience)	QK025-BZ
Cluster node OSSP 2 (high VMS experience)	QK026-7Z

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- (1)
- VAX-11/785-AJ VAX-11/785 CPU
- 4-Mbyte (64-K chip) ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- CI780-AB computer interconnect
- SC008-AC star coupler
- Two BNCIA-20 20-meter (60-foot) CI cables
- HSC50-AB intelligent I/O controller
- HSC5X-BA interface (four RA disk ports)
- QE001-UZ VAX/VMS license and warranty
- QED05-UZ DECnet license
- (2)
- VAX-11/785-AT VAX-11/785 CPU
- 4-Mbyte (64-K chip) ECC MOS memory
- FP785-AB Floating Point Accelerator
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- CI780-AB computer interconnect
- One BNCIA-20 20-meter (60-foot) CI cables
- QE001-UZ VAX/VMS license and warranty
- QED05-QZ DECnet VAXcluster license

Mass Storage Order Codes

System Device	Load Device PE = 1,600 b/in, GCR = 6,250 b/in		
	RA60 205 MB Removable Disk	TU81 PE/GCR Magtape	TA78 PE/GCR Magtape
RA60 205 MB (Removable Disk)	RA60-CD RA60-AA	RA60-CD TU81-AB	RA60-CD TA78-BJ HSC5X-CA
RA81 456 MB (Fixed Disk)	RA81-AD RA60-CD	RA81-AD TU81-AB	RA81-CD TA78-BJ HSC5X-CA
RA81 1,368 MB (3-Fixed Disks)	RA81-ED RA60-CD	RA81-ED TU81-AB	RA81-ED TA78-BJ HSC5X-CA

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

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F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

▼

Console Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

▼

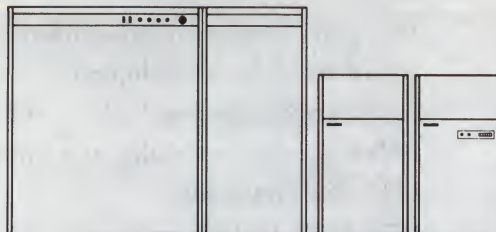
Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QE001-H‡
DECnet-VAX full function media and documentation on RX01 floppy disk	QE
OSSP 2	QE025-7‡
OSSP 3	QE025-B‡
OSSP 2	QE026-7‡

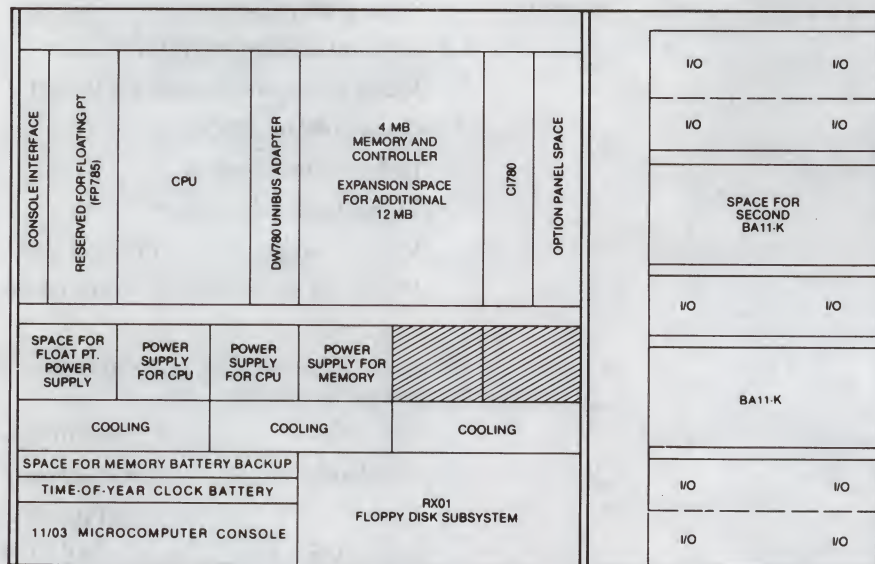
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

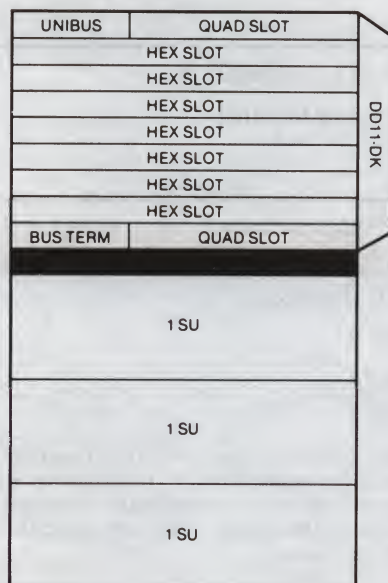
VAX-11/785 CPU Cabinet
 UNIBUS Expansion Cabinet
 Star Coupler Cabinet
 HSC50 Cabinet



VAX-11/785 CPU Cabinet
 Unibus Expansion Cabinet



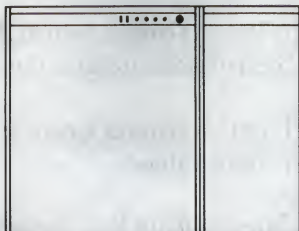
BA11-KV Expansion Mounting
 Box with DD11-DK Backplane



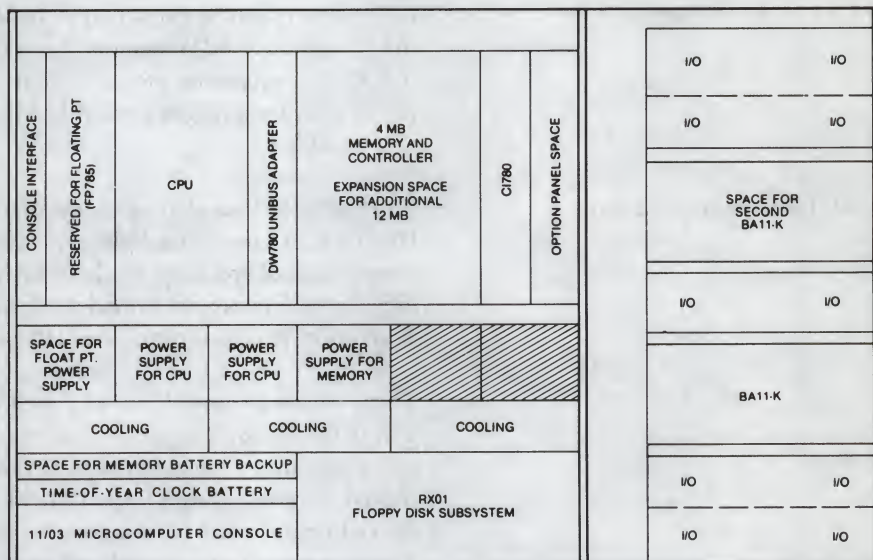
Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
BA11-K Box		4.0	10.0	19.0
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0			
SU 3-5: 3 SUs	32.0			

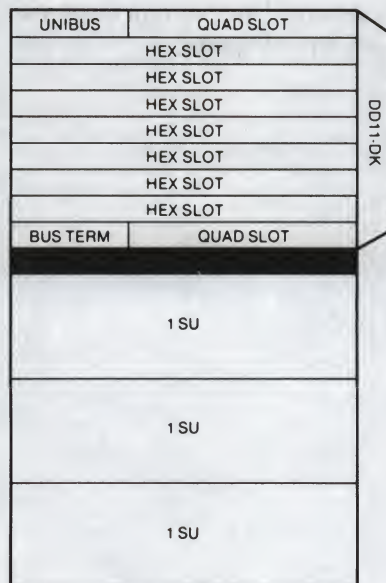
**VAX-11/785 CPU Cabinet
UNIBUS Expansion Cabinet**



**VAX-11/785 CPU Cabinet
Unibus Expansion Cabinet**



**BA11-KV Expansion Mounting
Box with DD11-DK Backplane**



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads	Panel Units
	+ 5V	+ 15V	-15V		
BA11-K Box		4.0	10.0	19.0	See 1.69
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0				
SU 3-5: 3 SUs	32.0				

The VAX-11/780 VAXcluster System Building Block consists of one CPU cabinet, one UNIBUS expansion cabinet, a star coupler cabinet, and an HSC50 cabinet.

VAX-11/780 VAXcluster Upgrade Configuration

CPU Cabinet

The VAX-11/780 VAXcluster Upgrade consists of one CPU cabinet, and one UNIBUS expansion cabinet.

The CPU cabinet contains local memory, one DW780 UNIBUS adapter, a CI780 computer interface, and one option panel space (OPS).

VAX-11/780 Memory

CPU memory can be expanded to 16 Mbytes with the addition of MS780-E/F (64-K chip) ECC MOS memory. An additional 16 Mbytes of MS780-E ECC MOS (64-K chip) expansion memory can be added in a CPU expander cabinet (H9652-H) for a system total of 32 Mbytes. Additional multiport memory can also be added.

UNIBUS Expansion Cabinet

The UNIBUS expansion cabinet contains one BA11-K expansion box with a DD11-DK expansion backplane, providing seven Hex and two Quad slots. Three system units of space are available in the expansion box for further backplane expansion. The cabinet provides expansion space for a second BA11-K expansion box or two 26.6-centimeter (10.5-inch) rack-mounted options.

There are ten groups of four (2.2 inch wide by 4.7 inch high) panel units available in the UNIBUS expansion cabinet I/O connection panel. Due to cable space limitations, a maximum of 32 of these panel units is available for multiplexed communications lines (DHU11, DMZ32, DZ11, and DMF32). The remaining eight panel units are available for the connector inserts to other options. Available panel units are reduced to 32 when the cabinet is configured with one 26.6-centimeter (10.5-inch) rack-mounted option. Available panel units are reduced to 24 when the cabinet is configured with two 26.6-centimeter (10.5-inch) rack-mounted options (not two RA series disks). These panel units can be used for any type of option.

Star Coupler Cabinet

The star coupler cabinet contains an eight-node dual-path computer-interconnect assembly. Two nodes are used for the CI780 and the HSC50, leaving six nodes available for expansion. With the addition of an SC008-AD, the SC008-AC can be expanded to accommodate eight more nodes for a total of 16.

HSC50 Intelligent I/O Server Cabinet

This cabinet includes one HSC5X-BA interface for up to four disk devices (RA80, RA81, or RA60) in any combination. There is expansion space available for up to five additional HSC5X interfaces, providing for a total of 24 disk or tape (formatters) device interfaces.

CI780 Cabling

Two sets of 20-meter dual-path computer interconnect cables (eight cables) connect the CI780 and the HSC50 to the star coupler cabinet.

CPU Options

- H7112 memory battery backup (dedicated space in cabinet, one per memory controller).
- MA780 multiport memory controllers (two per system).
- FP780 floating-point accelerator (dedicated space, one per system).
- KU780 user writable control store (dedicated space).
- DW780 UNIBUS adapter or MASSBUS adapter (four per system total).
- KE780 G & H floating-point microcode.
- Remote diagnosis feature with Field Service contract.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbytes (64-K chip) ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- CI780-AB computer interconnect
- SC008-AC star coupler
- Two BNCIA-20 20-meter (60-foot) CI cables (total of eight cables)
- HSC50-AB intelligent I/O controller
- HSC5X-BA interface (four RA disk ports)
- QE001-UZ VAX/VMS license and warranty
- QED05-UZ DECnet license

Mass Storage Order Codes

System Device	Load Device Disk/Tape (PE = 1600 b/in, GCR = 6,250 b/in)		
	RA60 205 MB (Removable Disk)	TU81 Magtape (PE/GCR)	TA78 Magtape (PE/GCR)
RA60 205 MB (Removable Disk)	RA60-CD RA60-AA	RA60-CD TU81-AB	RA60-CD TA78-BJ
RA81 456 MB (Fixed Disk)	RA81-AD RA60-CD	RA81-AD TU81-AB	RA81-CD TA78-BJ
RA81 1,368 MB (3-Fixed Disks)	RA81-ED RA60-CD	RA81-ED TU81-CD	RA81-ED TA78-BJ

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
<i>Software license for DSRVA</i>	<i>QK925-UZ</i>
<i>Media and documentation for DSRVA</i>	<i>QK925-HM</i>
<i>Country kit for DSRVA</i>	<i>DSRVK-A*</i>
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
<i>Software license for DECSA-CA or -DA</i>	<i>QK726-UZ</i>
<i>Media and Documentation for DECSA-CA or -DA</i>	<i>QK726-HM</i>
<i>Country kit for DECSA</i>	<i>DECSK-A*</i>

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France

**Console Terminal Order Code**

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

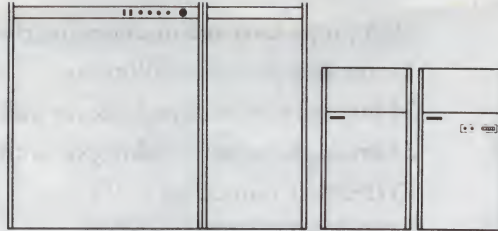
**Software and Service Order Codes†**

VAX/VMS media and documentation	QE001-H‡
DECnet-VAX full function media and documentation (H-kit) on RX01 floppy disk	QED05-HY
2-CPU cluster OSSP 2 (some VMS experience)	QE025-7‡
2-CPU cluster OSSP 3 (no VMS experience)	QE025-B‡
2-CPU cluster OSSP 2 (high VMS experience)	QE026-7‡

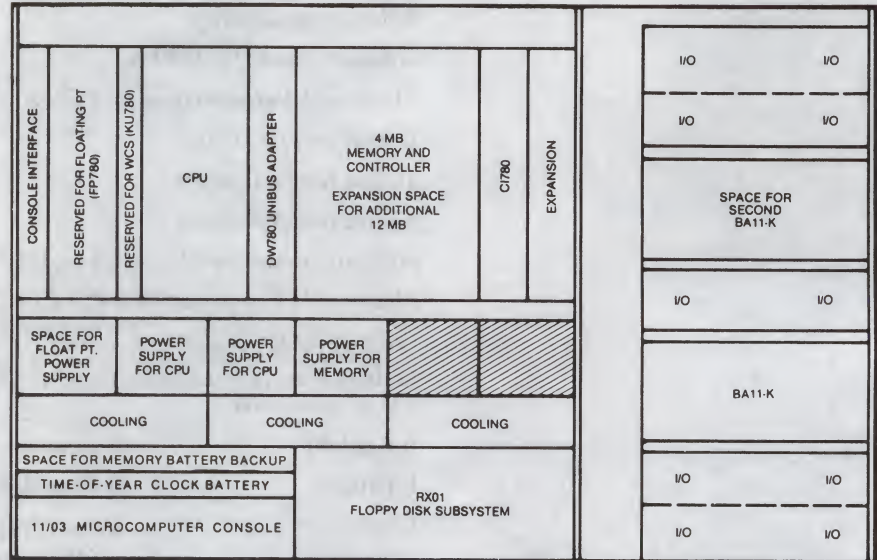
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

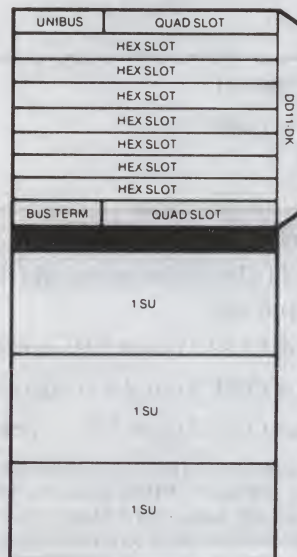
VAX-11/780



VAX-11/780 CPU Cabinet Unibus Expansion Cabinet



BA11-KV Expansion Mounting Box with DD11-DK Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads
	+ 5V	+ 15V	-15V	
BA11-K Box		4.0	10.0	19.0
SU 1-2: 7 Hex Slots, 2 Quad Slots	32.0			
SU 3-5: 3 SUs	32.0			

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbytes (64-K chip) ECC MOS memory
- H9652 UNIBUS expansion cabinet with BA11-K and DD11-DK
- CI780-AA(AB) computer interconnect
- One BNCIA-20 20-meter (60 foot) CI cable (total of four cables)
- QE001-UZ VAX/VMS license and warranty
- QED05-QZ DECnet VAXcluster license

Communication Device Order Codes

Direct Communication

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB

Ethernet/Lan

Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QE001-H‡
DECnet-VAX full function media and documentation (H-kit) on RX01 floppy disk	QED05-HY
2-CPU cluster OSSP 2 (some VMS experience)	QK025-7Z
2-CPU cluster OSSP 3 (no VMS experience)	QK025-BZ
2-CPU cluster OSSP 2 (high VMS experience)	QK026-7Z

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

Configurations

The VAX-11/750 is available in four VAXcluster SBB configurations. The four configurations are:

VAX-11/750 VAXcluster System Building Block (750CA-AJ)

Establishes the nucleus of a VAXcluster which can be joined by any other VAX with a computer interconnect. This system consists of the VAX-11/750 CPU, a CI750 computer interconnect, an HSC50 Intelligent I/O server, and a SC008 eight-node star coupler.

VAX-11/750 VAXcluster Upgrade (750CA-AT)

Adds a VAX-11/750 CPU to any existing VAXcluster. The upgrade includes the VAX-11/750 CPU and a CI750 computer interconnect.

VAX-11/750 VAXminicluster Building Block (750CB-AZ)

This is an entry level dual VAX-11/750 CPU VAXcluster that includes two VAX-11/750 CPUs, two CI750 computer interconnects, a four-node star coupler, and an HSC50 Intelligent I/O server. The two CI750s and the four-node star coupler are contained in a single 40.6-inch cabinet. The fourth node of the star coupler may be used to add any VAX with a computer interconnect to the VAXminicluster.

VAX-11/750 VAXminicluster Installed Unit Upgrade (750UB-AZ)

The installed unit upgrade creates a VAX-11/750 VAXminicluster (as described above) when combined with an existing VAX-11/750 CPU. In order to add the existing VAX-11/750 CPU to the VAXminicluster the following configuration requirements must be met:

- 4 Mbyte memory (minimum)
- VAX/VMS Operating System Version 4.0
- CPU at Revision Level 7
- DECnet Full Function license (QDD05-UZ)

CPU Cabinet

The CPU cabinet contains the CPU backplane and a UNIBUS expansion backplane. The VAX-11/750 CPU backplane has dedicated slots for CPU options and additional memory, and two general purpose I/O adapter slots (I/O slots). The computer interconnect interface module occupies a third I/O slot. The UNIBUS expansion backplane provides seven Hex and two Quad slots for mounting menu selections and additional UNIBUS options.

CI750 Cabinets

The CI750 (computer interconnect) is a microprocessor-controlled, fully buffered high-speed interface between the memory interconnect of the CPU and the dual-path CI bus. The CI750 is mounted in a 101.6-meter (40.6-inch) high free-standing cabinet. The following configurations are available: (a) single CI750 with cabinet (CI750-BD); (b) two CI750s plus a four-node star coupler in one cabinet (CI750-FB).

Star Coupler Cabinet

The (SC008) star coupler cabinet contains an eight-node dual-path computer-interconnect assembly. Two nodes are used for the CI750 and the HSC50, leaving six nodes available for expansion. With the addition of an SC008-AD, the SC008-AC can be expanded to accommodate eight more nodes for a total of 16.

Note that a four-node star coupler is included in a cabinet with two CI750s (CI750-FB). The four-node Star Coupler is only available in this configuration.

HSC50 Intelligent I/O Server Cabinet

This cabinet includes one HSC5X-BA interface for up to four disk devices (RA80, RA81, or RA60) in any combination. There is expansion space available for up to five additional HSC5X interfaces, providing for a total of 24 disk or tape (formatters) device interfaces.

CI750 Cabling

Two sets of 20-meter dual-path computer-interconnect cables (eight cables) connect the CI750 and the HSC50 to the (SC008) star coupler cabinet. For the CI750-FB one set of these cables connects the HSC50 to the four-node star coupler.

CPU Options

- H7112 memory battery backup (dedicated space in cabinet, one per memory controller).
- FP750 floating-point accelerator (dedicated space, one per system).
- DW750 UNIBUS adapter.
- Remote diagnosis feature with Field Service contract.

Menu Component Selections

- Mass Storage
- Communication Devices
- Console Terminal
- Software (VAX/VMS media and documentation)

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbyte (64-K chip) ECC MOS memory
- CI750-BD computer interconnect
- SC008-AC star coupler
- Two BNCIA-20 20-meter (60-foot) CI cables (total of eight cables)
- HSC50-AB intelligent I/O server
- HSC5X-BA interface
- QD001-UZ VAX/VMS license and warranty
- QDD05-UZ DECnet license

Mass Storage Order Codes

LOAD DEVICE*

PE = 1600 b/in, GCR = 6250 b/in

System Device	RA60 205 MB (Removable Disk)	TU81 PE/GCR Magtape	TA78 (PE/GCR) Magtape
RA60 205 MB (Removable Disk)	RA60-CD RA60-AA	RA60-CD TU81-AB	RA60-CD TA78-BJ
RA81 456 MB (Fixed Disk)	RA81-AD RA60-CD	RA81-AD TU81-AB	RA81-CD TA78-BJ
RA81 1,368 MB (3-Fixed Disks)	RA81-ED RA60-CD	RA81-ED TU81-AB	RA81-ED TA78-BJ

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LE
16-line asynchronous multiplexer	DHU11-AE
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France

**Console Terminal**

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA

**Software and Service Order Codes†**

VAX/VMS media and documentation (H-kit)	QD001-H‡
DECnet-VAX full function media and documentation (H-kit) on TU58 tape cassette	QDD05-HG
2-CPU cluster OSSP 2 (some VMS experience)	QD025-7‡
2-CPU cluster OSSP 3 (no VMS experience)	QD025-B‡
2-CPU cluster OSSP 2 (high VMS experience)	QD026-7‡

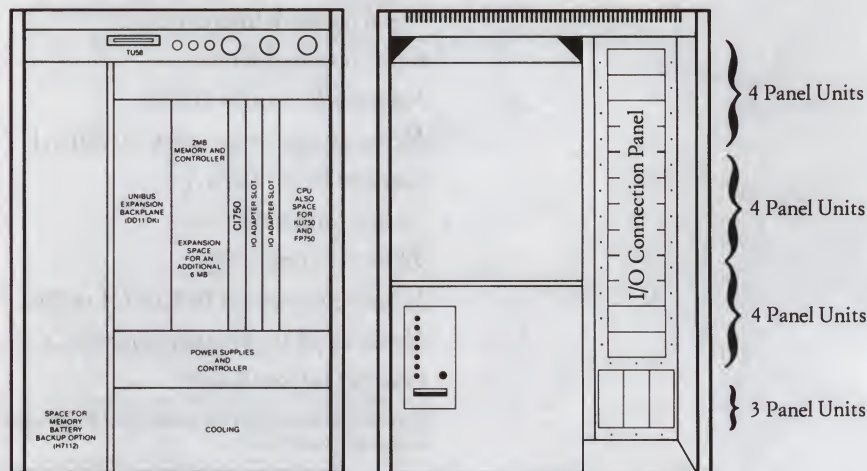
†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

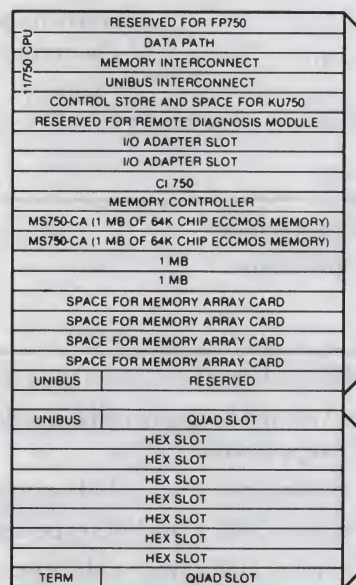


VAX-11/750 CPU Cabinet

VAX-11/750 CPU Cabinet (Rear View)



VAX-11/750 CPU Cabinet System Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads	Panel Units
	+ 5V	+ 15V	-15V		
DD11-DK UNIBUS	32.0	2.0	3.5	19.0	15
Expansion Backplane: 7 Hex slots, 2 Quad slots					

System Upgrade

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- 4-Mbyte (64-K chip) ECC MOS memory
- CI750-BD computer interconnect
- BNCIA-20 20-meter (60-foot) CI cables
- QD001-UZ VAX/VMS license and warranty
- QDD05-QZ DECnet license

Communication Device Order Codes*Direct Communication*

Multipurpose communications interface	DMF32-LE
16-line asynchronous multiplexer	DHU11-AE
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Console Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA12-DB
Hardcopy terminal	LA120-DA

Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QD001-H‡
DECnet-VAX full function media and documentation (H-kit) on TU58 tape cassette	QDD05-HG
Cluster Node OSSP 2 (some VMS experience)	QD025-7Z
Cluster Node OSSP 3 (no VMS experience)	QD025-BZ
Cluster Node OSSP 2 (high VMS experience)	QD026-7Z

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

A fully supported system is configured by selecting at least one each from the system device, load device, communication device, and console terminal menus. You may select one or more items from the software menu. If your order disregards the menu selection process then the system may not be fully supported. In this case, you should refer to the sales administration process for non-standard orders.

- Two VAX-11/750 CPUs
- 4-Mbyte (64-K chip) ECC MOS memory (each CPU)
- CI750-FB (Two CI750s and one four-node Star Coupler)
- One BNCIA-20 20-meter (60-foot) CI cable set
- HSC50-AB intelligent I/O server
- HSC5X-BA disk interface
- Two QD001-UZ VAX/VMS license and warranty
- QDD05-UZ DECnet license
- QDD05-QZ DECnet VAXcluster license

Mass Storage Order Codes

System Device	Load Device PE = 1600 b/in, GCR = 6250 b/in		
	RA60 205 MB (Removable Disk)	TU81 PE/GCR Magtape	TA78 (PE/GCR) Magtape
RA60 205 MB (Removable Disk)	RA60-CD RA60-AA	RA60-CD TU81-AB	RA60-CD TA78-BJ
RA81 456 MB (Fixed Disk)	RA81-AD RA60-CD	RA81-AD TU81-AB	RA81-CD TA78-BJ
RA81 1,368 MB (3-Fixed Disks)	RA81-ED RA60-CD	RA81-ED TU81-AB	RA81-ED TA78-BJ

Communication Device Order Codes**Direct Communication**

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY
ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB
Software license for DSRVA	QK925-UZ
Media and documentation for DSRVA	QK925-HM
Country kit for DSRVA	DSRVK-A*
16-line terminal server	DECSA-CA
32-line terminal server	DECSA-DA
Software license for DECSA-CA or -DA	QK726-UZ
Media and Documentation for DECSA-CA or -DA	QK726-HM
Country kit for DECSA	DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		



Console Terminal Order Codes

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA120-DA



Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QD001-H‡
DECnet-VAX full function media and documentation (H-kit) on TU58 tape cassette	QDD05-HG
2-CPU cluster OSSP 2 (some VMS experience)	QD025-7‡
2-CPU cluster OSSP 3 (no VMS experience)	QD025-B‡
2-CPU cluster OSSP 2 (high VMS experience)	QD025-7‡

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

VAX-11/750 VAXminicluster**750UB-AZ*****Installed Unit Upgrade**

A fully supported system is configured by selecting at least one each from the System device, Load device, Communication device and Console Terminal menus. You may select one or more items from the Software menu. If you order disregards the menu selection process then the system may not be fully supported, in this case you should refer to the Sales Administration process for non-standard orders.

- 4-Mbyte (64-K chip) ECC MOS memory
- CI750-FB (Two CI750s and one four-node Star Coupler)
- One BNCIA-20 20-meter (60-foot) CI cable set
- HSC50-AB intelligent I/O server
- HSC5X-BA disk interface
- QD001-UZ VAX/VMS license and warranty
- QDD05-UZ DECnet license
- QDD05-QZ DECnet VAXcluster license
- 4 Mbyte memory (minimum)
- VAX/VMS Operating System Version 4.0
- CPU at Revision Level 7
- DECnet Full Function license (QDD05-UZ)

*This System Building Block is intended to form a VAXminicluster when combined with an existing VAX-11/750 CPU. In order to add the existing VAX-11/750 CPU to the VAXminicluster the following configuration requirements must be met:

**Communication Device Order Codes***Direct Communication*

Multipurpose communications interface	DMF32-LD
16-line asynchronous multiplexer	DHU11-AD
24-line asynchronous multiplexer with modem control	DMZ32-AY
24-line asynchronous multiplexer without modem control	DM32Z-DY

Ethernet/Lan

ETHERNET transceiver	H4000
ETHERNET/UNIBUS interface	DEUNA-AA
Local network interconnect	DELNI-AB
8-line terminal server	DSRVA-AB

Software license for DSRVA QK925-UZ

Media and documentation for DSRVA QK925-HM

Country kit for DSRVA DSRVK-A*

16 terminal server DECSA-CA

32-line terminal server DECSA-DA

Software license for DECSA-CA or -DA QK726-UZ

Media and Documentation for DECSA-CA or -DA QK726-HM

Country kit for DECSA DECSK-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France

**Console Terminal Order Codes**

Hardcopy terminal	LA100-BB
Hardcopy terminal	LA12-DB
Hardcopy terminal	LA120-DA



Software and Service Order Codes†

VAX/VMS media and documentation (H-kit)	QD001-H‡
DECnet-VAX full function media and documentation (H-kit) on TU58 tape cassette	QDD05-HG
2-CPU Cluster OSSP 2 (some VMS experience)	QD025-7Z
2-CPU Cluster OSSP 3 (no VMS experience)	OD025-BZ
2-CPU Cluster OSSP 2 (high VMS experience)	QD026-7Z

†Media and documentation (H-kit) are required for the first VAX system purchased *unless* the customer is buying one of the OPTIMUM Startup Service Packages (OSSP) with the standard software license. OSSPs include media and documentation.

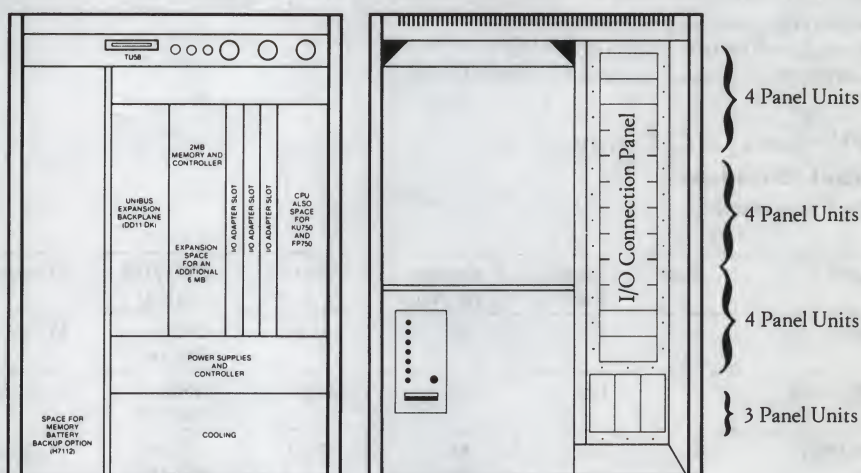
‡To complete the software order code replace the double dagger in the order code with a J for RA60 or an M for magtape.

VAX-11/750 CPU Star Coupler Cabinet HSC50 Cabinet

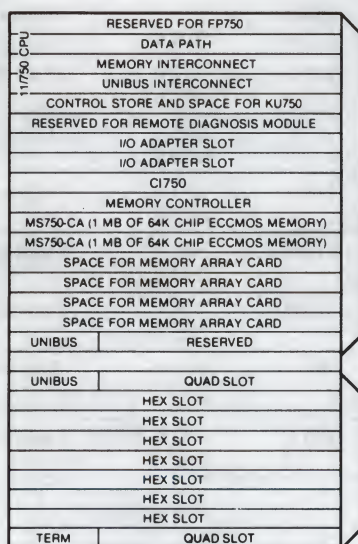


VAX-11/750 CPU Cabinet

VAX-11/750 CPU Cabinet (Rear View)



VAX-11/750 CPU Cabinet System Backplane



Available UNIBUS Expansion

Space	DC Amps @			Bus Loads	Panel Units
	+ 5V	+ 15V	-15V		
DD11-DK UNIBUS	32.0	2.0	3.5	19.0	15
Expansion Backplane: 7 Hex slots, 2 Quad slots					

Site Preparation CPU Data

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
11730 CPU	⁴	240	50-60	1	4.50	854	2914 [3074]	6-15R	41.70 [105.9]	21.25 [53.98]	31.5 [80.0]	348.0 ⁶ [158.0] ⁶
11750 CPU	³	240	50-60	1	5.75	1062	3624 [3823]	6-15R	41.70 [105.90]	29.00 [73.66]	31.5 [80.0]	440.0 ⁶ [199.8] ⁶
11780 CPU		240/416	50	3	10.80	2061	[7419]	⁷	[153.00]	[118.11]	[76.2]	[456.3] ⁶
VAX 8600		240/415	50	3	22.00	6500	22000	⁷	[153.70]	[180.00]	[76.2]	1925.0
SV-CXMMMA	⁵	240	50-60	1	3.75	720	2457 [2592]	6-15R	41.70 [105.90]	21.25 [53.98]	31.5 [80.0]	440.0 ⁶ [199.8] ⁶

¹ The 11782 data includes power and cooling requirements of two 11780 CPUs, 2MB local memory per CPU, and a shared memory cabinet with 1MB memory.

The primary processor contains a DW780 UNIBUS Adapter.

² The 11780 data includes power and cooling requirements of the CPU, 2MB memory and a DW780 UNIBUS Adapter.

³ The 11750 data includes power and cooling requirements of the CPU, 1MB memory and a fully configured DD11-DK UNIBUS Expansion Backplane.

⁴ The 11730 data includes power and cooling requirements of the CPU, 1MB memory and a fully configured DD11-DK UNIBUS Expansion Backplane.

⁵ All data is for fully configured package systems.

⁶ All weights are for fully configured cabinets.

⁷ No NEMA type receptacle available for 240/416V variations.

CPU, Memory & CI Options

(Non-Cabinet Level)

Site Preparation

Model	Note	Voltage V ac	Current AC Amps	Watts	BTUs/HR (KJ/HR)	Mounting Code Description
CI750	⁵	240	.46	85.0	290.0 (306.0)	I/O Slots in CPU Backplane
CI780-AB		120	2.40	452.0	1542.0 (1627.0)	1 OPS Slot - CPU or CPU Expander Cab
DR750-F		240	.85	157.0	536.0 (565.0)	I/O Slots in CPU Backplane
DR780-AB		240	1.20	226.0	771.0 (814.0)	1 OPS Slot - CPU or CPU Expander Cab
DW750	⁴	240	.44	80.0	273.0 (288.0)	I/O Slots in CPU Backplane
DW780-AB		240	.80	153.0	522.0 (551.0)	1 OPS Slot - CPU or CPU Expander Cab
FP730		240	.42	81.0	276.0 (292.0)	Dedicated Slot in CPU Backplane
FP750		240	.65	118.0	403.0 (425.0)	Dedicated Slot in CPU Backplane
FP780-AB		240	1.40	270.0	921.0 (972.0)	Dedicated Space in CPU Backplane
H7112-B		240	.13	25.0	8.5 (90.0)	Dedicated Space in CPU, H9652-H Cab, or MA780-J Cab
KE780		N/A	N/A	N/A	N/A	Plugs into KU780 Module
KU750-YG		N/A	⁶	⁶	⁶	Dedicated Slot in CPU Backplane
KU780		240	.50	100.0	341.0 (360.0)	Dedicated Slot in CPU Backplane

Model	Note	Voltage V ac	Current AC Amps	Watts	BTUs/HR (KJ/HR)	Mounting Code Description
MA780-BB		240	1.50	288.0	983.0 (1037.0)	Dedicated Space in MA780-JA(JB) Cab
MA780-D		240	.50	100.0	341.0	Dedicated Space in MA780-J or MA780-B
MA780-EB		240	1.00	200.0	682.0 (720.0)	OPS or SBI Terminator Slot – CPU or CPU Expander Cab
MBA750		240	.46	85.0	290.0 (306.0)	I/O Slots in CPU Backplane
MBA780		240	.80	153.0	522.0 (551.0)	1 OPS Slot – CPU or CPU Expander Cab
MS730-CA		240	.07	12.0	41.0 (43.0)	Dedicated Slots in CPU Backplane
MS750-CA		240	.07	12.0	41.0 (43.0)	Dedicated Memory Slots in CPU Backplane
MS780-C	¹	240	1.50	288.0	983.0 (1037.0)	2 OPS Slot – CPU Expander Cab Only
MS780-D	³	240	.07	12.0	41.0 (43.0)	Dedicated Slots in MS780-C Backplane
MS780-E	¹	240	1.50	288.0	983.0 (1037.0)	2 OPS Slot – CPU Expander Cab Only
MS780-F	²	240	.07	12.0	41.0 (43.0)	Dedicated Slots in MS780-E Backplane
SC008-AD		N/A	N/A	N/A	N/A	Dedicated Space SC008-AC Cab

NOTES = CPU, MEMORY AND CI OPTIONS (NON-CABINET LEVEL)

¹ 256KB version.

² 2MB version.

³ MS780-D modules also mounted in MA780 Memory Backplanes which are part of MA780-J, MA780-B and MA780-K.

⁴ Includes UNIBUS cable. Requires Expander Cab (H9642-F), Expander Box (BA11-K) and DD11-DK Backplane.

⁵ CI750 interface module is part of the CI750-BA(BB). Refer to Memory and CPU Option (Cab Level) Table for remaining data for this option.

⁶ Replaces existing CPU module. Power/Cooling requirements are included in CPU data.

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
CI750-BD	⁴	240	50-60	1	2.0	364	1242 [1310]	L5-30R 6-15R	41.7 [106.0]	20.3 [51.4]	30.0 [76.2]	235.0 [106.7] ¹
CI750-FB	⁴	240	50-60	1	4.0 ⁵	728	2484 [2610]	65-30R ⁵ 6-15R ⁵	41.7 [106.0]	20.3 [51.4]	30.0 [76.2]	
CI750-HB	⁴	240	50-60	1	4.0 ⁵	728	2484 [2610]	65-30R ⁵ 6-15R ⁵	41.7 [106.0]	20.3 [51.4]	30.0 [76.2]	
H9554-XE		N/A	N/A	0	N/A	N/A	N/A	N/A	60.3 [153.0]	30.0 [76.2]	30.0 [76.2]	200.0 ¹ [90.8] ¹
MA780-JB		240/416	50-60	3	X + 2.8 ³	X + 540 ³	[X + 1944] ³ ²		60.3 [153.0]	26.3 [66.7]	30.0 [76.2]	700.0 ¹ [318.0] ¹
MA780-KB		240/416	50-60	3	X + 4.7 ³	X + 902 ³	[X + 3247] ³ ²		60.3 [153.0]	26.3 [66.7]	30.0 [76.2]	700.0 ¹ [318.0] ¹
SC008-AC		N/A	N/A	0	N/A	N/A	N/A	N/A	41.7 [106.0]	21.0 [53.3]	30.0 [76.2]	150.0 ¹ [68.1] ¹

NOTES = MEMORY AND CPU OPTIONS (CABINET LEVEL)

¹ All weights are given for a fully configured product.

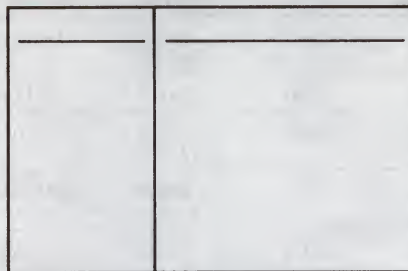
² No NEMA type receptacle available for 240/416V variations.

³ X = Requirements (cooling, power) of internally mounted options.

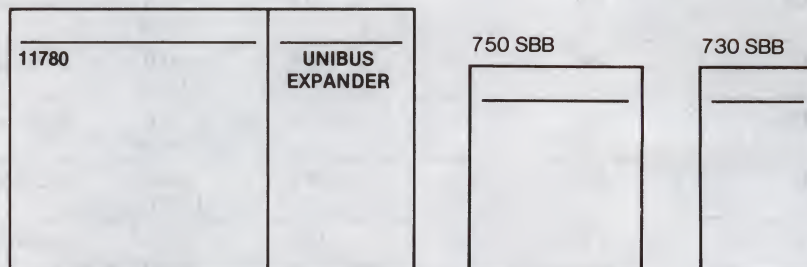
⁴ For power and cooling requirements of CI750 interface Module, see Site Preparation Data for Non-Cabinet Level Options.

⁵ The power requirements given above are divided equally between two separate power controllers in the CI750-xx cabinet. Each of the power controllers has a cord/plug for external power.

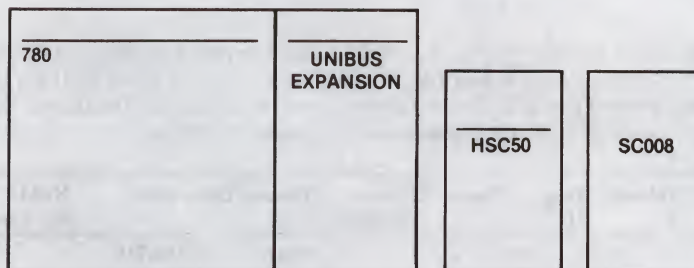
VAX 8600 SBB



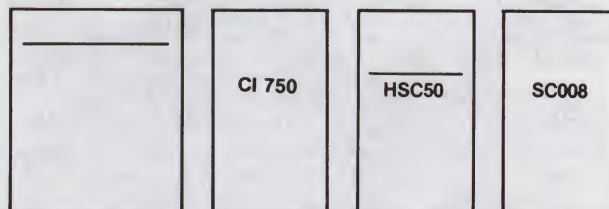
785/780 SBB or 785/780 Cluster Upgrade



785 or 780 Cluster SBB



750 Cluster SBB



The first step in the process of creating a new system is to identify the problem that needs to be solved. This involves gathering information about the current system and the requirements for the new system. Once the problem is identified, the next step is to design the system. This involves creating a blueprint for the system that shows how the components will be connected and how the data will be processed. The design phase is critical because it determines the overall structure and functionality of the system.

After the design is complete, the next step is to implement the system. This involves building the system according to the design specifications. Implementation typically involves writing code, configuring hardware, and testing the system to ensure it meets the requirements. Once the system is implemented, the final step is to maintain and update it as needed.

The process of creating a new system is a complex one that requires careful planning and execution. It involves a series of steps that are interconnected and often iterative. The goal is to create a system that is efficient, reliable, and meets the needs of the users. This requires a deep understanding of the problem and the ability to translate that understanding into a technical solution.

In the early days of computing, systems were often built from scratch. This meant that the designers had to create every component of the system, from the hardware to the software. This was a time-consuming and expensive process, but it allowed for a high degree of customization. As technology advanced, the process of creating systems became more standardized and efficient.

Today, the process of creating systems is much more streamlined. There are many tools and frameworks available that make it easier to design and implement systems. However, the fundamental principles of system design remain the same. The key is to understand the problem and to create a solution that is tailored to the specific needs of the users.

As the field of systems continues to evolve, it is important to stay up-to-date on the latest trends and technologies. This involves ongoing learning and experimentation. The goal is to create systems that are not only functional but also innovative and efficient. This requires a combination of technical skill and creative problem-solving.

Digital's PDP-11 systems are based on a compatible set of processors which use a common architecture and a common instruction set. All are capable of supporting any of seven PDP-11 operating systems. PDP-11 systems offer the widest selection of operating systems, languages, data management, communications, and applications software in the industry. In addition, they can easily be connected to our larger VAX systems, to personal computers, to other vendors' mainframes, and into an Ethernet.

The **Systems** and **Software** sections of this catalog give you quick and easy access to the hardware and software that will meet your requirements. The CPU Selection Chart on this page compares Digital PDP-11 systems.

Systems is divided into two parts: Q-bus systems and UNIBUS systems. The major difference between the two systems is the type and variety of peripheral devices they use.

The Q-bus supports small, economical computer systems including the MicroPDP-11/23, the new MicroPDP-11/73, and the PDP-11/23-PLUS. These systems support up to 31 Mbytes per drive, and support four to 12 concurrent users. The fastest networking interface runs at 56 Kbits per second.

Applications that require high-speed communication or disk capacity up to 456 Mbytes per drive are based on UNIBUS PDP-11/24 and PDP-11/44 systems. (Many UNIBUS peripherals are also supported on Digital's 32-bit VAX superminicomputers.)

Software media, documentation, and support services for each operating system are located on the Operating System Ordering Chart in the **Software** section of this catalog. To select a terminal to suit your application, consult **Terminals and Printers**.

The Q-bus family includes base and packaged systems, System Building Blocks, and a variety of chips, single-board computers, and components which are described in more detail in **Components**.

Three Q-bus multiuser systems are offered: the PDP-11/23-PLUS, MicroPDP-11/23, and the MicroPDP-11/73. All three execute the PDP-11 instruction set, support many of the same devices, and offer the same memory and performance enhancement options.

The MicroPDP-11s are designed for small, multiuser applications where an economical system is desired. The PDP-11/23-PLUS is more expandable and can handle a wider range of concurrent functions, more communications, and more mass storage. The smallest and lowest priced PDP-11/23-PLUS CPU package is the PDP-11/23-S.

Features

- Physical memory addressing up to four Mbytes (backplane space permitting) for improved performance in multiuser applications.
- Optional non-volatile CMOS memory for use in environments where power conditions are uncertain.
- Parity MOS memory expansion in 256 Kbytes or increments of 512 Kbytes.
- Three CPU operating modes: kernel, user, and supervisor.
- Diagnostic bootstrap which tests memory, CPU, and the console terminal on startup, then boots the system from a designated disk or DECnet line.
- I/O Connection Panel to simplify cable management.

MicroPDP-11/73 Models	Memory	Mass Storage	Enclosure	License Included
11/73-BD	512 KB	No	Rackmount	No
SX-EA52E	512 KB	2 × 0.4 MB Diskette 31 MB Winchester	Floor/Table	Yes
SX-EA54E	512 MB	31 MB Winchester Magtape Subsystem	Floor/Table	Yes
173QY-B3	512 KB	menu selectable	menu selectable	menu selectable
173QZ-B3	512 KB	menu selectable	menu selectable	menu selectable
11H73-AB	512 KB	52 MB Disk (26 Fixed/26 Removable)	Cabinet (H9642)	No

MicroPDP-11/23 Models	Memory	Mass Storage	Enclosure	License Included
11A23-F	256 KB	2 × 0.4 MB Diskette	Floor/Table	No
11A23-R	256 KB	2 × 0.4 MB Diskette	Rackmount	No
11C23-F	256 KB	2 × 0.4 MB Diskette 11 MB Winchester	Floor/Table	No
11C23-FE	512 KB	2 × 0.4 MB Diskette 11 MB Winchester	Floor/Table	No
11C23-R	256 KB	2 × 0.4 MB Diskette 11 MB Winchester	Rackmount	No
11E23-FD	256 KB	2 × 0.4 MB Diskette 31 MB Winchester	Floor/Table	No
11E23-RD	256 KB	2 × 0.4 MB Diskette 31 MB Winchester	Rackmount	No
11E23-FE	512 KB	2 × 0.4 MB Diskette 31 MB Winchester	Floor/Table	No
11E23-RE	512 KB	2 × 0.4 MB Diskette 31 MB Winchester	Rackmount	No
11H23-AB	512 KB	52 MB Disk (26 Fixed/26 Removable)	Cabinet (H9642)	No
SX-RA500*	256 KB	2 × 0.4 MB Diskette 11 MB Winchester	Floor/Table	Yes
SX-RA520 *	512 KB	2 × 0.4 MB Diskette 31 MB Winchester	Floor/Table	Yes

*SX-RA500 and SX-RA50E include a DZV11 four-line asynchronous multiplexer.

Model PDP-11/23 +	Memory	Mass Storage	Enclosure	License Included
11/23-BD	256 KB	No	13.3 cm (5.25 in) Rackmount	No
11/23-BF	512 KB	No	13.3 cm (5.25 in) Rackmount	No
SX-RXMMMA	512 KB	20 MB	H9642 Cabinet Cartridge Disk	Yes

Model PDP-11/23-S	Memory	Mass Storage	Enclosure	License Included
11/23-SD	32 KB	No	8.8 cm (3.5 in) Rackmount	No
11/23-SF	64 KB	No	8.8 cm (3.5 in) Rackmount	No

Q-bus Options Checklist

Processor Options

The following is a list of system options for the MicroPDP-11/73, MicroPDP-11/23, the PDP-11/23-PLUS, and the PDP-11/23-S. The options and all ordering details are completely described in the **Options, Components, Disks and Tapes, and Terminals and Printers** sections of this catalog.

Floating point chip	▪ KEF11-AA
Commercial Instruction Set chip	▪ KEF11-BB
Floating point processor	▪ FPF11

<i>Memory Options</i>	32 KB CMOS memory	▪ MCV11-DC
	128 KB memory	▪ MSV11-LF
	256 KB memory	▪ MSV11-LK
	256 KB parity memory	▪ MSV11-PK
	512 KB parity memory	▪ MSV11-PL
	One-Mbyte MOS memory	▪ MSV11-QA
	Two-Mbyte MOS memory	▪ MSV11-QB
	Four-Mbyte MOS memory	▪ MSV11-QC

<i>Communication Options</i>	Ethernet communications controller	▪ DEQNA
	Eight-line EIA multiplexer (modem control)	▪ DHV11
	Single-line EIA interface (modem control)	▪ DLVE1
	Four-line EIA interface	▪ DLVJ1
	DECnet interface	▪ DMV11
	Synchronous interface (56 KB/s max)	▪ DPV11
	Synchronous interface (9.6 KB/s max)	▪ DUV11
	Four-line EIA multiplexer (modem control)	▪ DZV11
	Four-line asynchronous multiplexer (modem control)	▪ DZQ11
	Single-line synchronous/asynchronous interface	▪ KMV11
	T-11-based I/O processor, three synchronous/asynchronous lines, 20 parallel lines, three timers	▪ KXT11

<i>Realtime Options</i>	Digital to analog converter	▪ AAV11-C*
	Analog to digital converter	▪ ADV11-C*
	Analog I/O device	▪ AXV11-C*
	IEEE interface	▪ IEQ11
	Realtime clock	▪ KWV11
	DMA parallel interface	▪ DRV11
	DMA parallel interface	▪ DRQ11
	Industrial I/O module family	▪ IXV11
	High-speed A/D converter	▪ ADF01

*Analog options are available as **add-on options** for installation by technically experienced customers. They are compatible with the system backplane but are not installed in a Digital manufacturing facility. Analog options do not include I/O Connection Panel inserts, nor are they qualified for use in a FCC Class A system.

Note: Refer to **Options** for additional processor and realtime options.

<i>Peripherals</i>	RL02 disk controller	▪ RLV12
	Cartridge disk subsystem	▪ RLV22
	Floppy disk subsystem	▪ RXV21
	Internal dual mini-diskette drive	▪ RX50
	Internal 11 MB Winchester drive	▪ RD51
	Internal 31 MB Winchester drive	▪ RD52
	RX50/RD51/RD52 disk controller	▪ RQDX1
	52 Mbyte fixed/removable disk subsystem tabletop	▪ RQC25
	Cassette subsystem	▪ TU58
	Magnetic tape subsystem	▪ TSV05
	60 MB cartridge tape	▪ TQK25
	Lineprinters	▪ LPV11

<i>Expansion Hardware</i>	Expansion box for PDP-11/23-PLUS	▪ BA11-SF
	Bus expansion cable and terminator for BA11-SF	▪ BCV2A-03
	Bus expansion cable for BA11-SE(SF) with no termination	▪ BCV2B-10

The MicroPDP-11 computer family enables small organizations to buy minicomputer power and multiuser capacity in two economical variations. The original member of the family, the MicroPDP-11/23, accommodates four to six active users. The newest member, the MicroPDP-11/73, can handle larger applications with up to 12 simultaneous users. Both models feature the same space-efficient system box that can easily fit under a desk.

The MicroPDP-11/23 uses the F-11 chip set for processing power in smaller business environments. The MicroPDP-11/73 CPU module includes the J-11 chip set for even faster processing, cache memory, a 32-Kbyte bootstrap diagnostic ROM, a console serial line unit, and a line frequency clock. Memory for both models is expandable in 256- or 512-Kbyte increments, up to a maximum of four Mbytes.

For both systems, integral storage choices include an 11-Mbyte (RD51) or 31-Mbyte (RD52) Winchester disk. The RX50 floppy diskette subsystem, included in most MicroPDP-11s, accepts two single-sided 5.25-inch diskettes, each with a capacity of 400 Kbytes. The RQDX1 controller handles both Winchester disks and the floppy diskette, and performs Direct Memory Access (DMA) block-mode transfers for maximum system efficiency. A tabletop streaming tape subsystem (TK25) provides fast, simple backup.

Both the MicroPDP-11/73 and the MicroPDP-11/23 support six operating systems including Micro/RXS, a low-cost version of Digital's RSX-11M-PLUS operating system, and Micro/RSTS, a subset of RSTS/E that supports all of the RSTS/E system calls and programming facilities. Both are distributed on floppy disk, and installation is simple.

The MicroPDP-11 family also uses RT-11 (a single-user realtime system), CTS-300 (for small business timesharing), DSM-11 (an integrated operating system using the ANSI-standard MUMPS language) and ULTRIX-11, Digital's enhanced native mode UNIX™ software. An extensive list of programming languages including BASIC, COBOL-81, CORAL-66, DIBOL, FORTRAN-77, MACRO-11, MUMPS and PASCAL are all supported by the MicroPDP-11 family.

Features

- 256- or 512-Kbyte increments of parity MOS memory expandable up to four Mbytes
- One-serial line standard (11/73) or two serial lines standard (11/23) for connection of console terminal
- Eight-slot extended Q-bus backplane
- I/O distribution panel for easy terminal and printer hookup
- Choice of floor stand or rackmount packaging
- Compatible with VAX
- Optional four-line or eight-line asynchronous multiplexer from 50 to 9,600 baud (DZV11, DZQ11, or DHV11)
- Native-language documentation and appropriate power cord
- Optional Ethernet capability, dial in/out, 2780/3780 (DEQNA)

Wide choice of storage devices:

- 11-Mbyte or 31-Mbyte Winchester disks (RD51 or RD52)
- 800-Kbyte dual drive diskette (RX50)
- 60-Mbyte tabletop streaming tape (TK25)
- 52-Mbyte (26 fixed, 26 removable) tabletop Winchester (RC25)

MicroPDP-11/73 Specific Features

- Floating point instruction set in microcode
- Eight-Kbyte direct-mapped cache memory
- 32-Kbyte bootstrap ROM

System Disk Expansion

MicroPDP-11 packaging can accommodate *one* RD51 or RD52 Winchester disk, and *one* RX50 diskette drive inside the basic system enclosure. An additional external Winchester or diskette drive may also be added.

Both the TK25 streaming tape and RC25 Winchester disk subsystem are externally mounted. The RC25 is available in rackmount and tabletop versions; the TK25 is available in tabletop only. (See Disks and Tapes section)

Configuring MicroPDP-11 Multiuser Systems

Power Requirements and Bus Loads

Each option requires mounting space (quad- or dual-slot), DC current, and AC and DC bus loads. Subtract the option from the available amps and bus loads (see configuring templates).

Each available option slot can accept one quad option or two dual options. When configuring options, place dual width options beside each other to efficiently use the slot place. If you have a dual option followed by a quad option, a bus grant continuity card will be supplied.

I/O Connection Panel Insert Space

In addition to the routine factors of option power requirements and available backplane slots, the utilization of the I/O Connection Panel must be considered.

The I/O Connection Panel for the MicroPDP-11s is a 30.4- × 12.7-centimeter (12 × 5-inch) plate located at the back of the system box designed to simplify cable management. It is used to mount connectors (panel inserts) for communications and peripheral cables which connect the CPU to these devices.

Options have panel inserts which come in two sizes: Size A: 2.5- × 10.1-centimeter, (1 × 4-inch); and Size B: 6.6- × 8.1-centimeter, (2.6- × 3.2-in). The I/O Connection Panel has space for two Size A inserts and four Size B inserts. An adapter plate is included for converting two Size B inserts to three Size A inserts.

Refer to the Options Configuring Charts in Section 3 – **Options**, and to Section 5 – **Disks and Tapes**, for the power requirements, bus loads, backplane, and I/O Connection Panel insert sizes for each option.

Cabinet Notes for Hardware Integrators

The following guidelines should be used for mounting the MicroPDP-11 into cabinets:

- When it is mounted into a rack, the MicroPDP-11 is cooled by air flowing from side-to-side.
- Any devices that are cooled by air flowing from front to back can be mounted in the same cabinet; i.e., one MicroPDP-11 with two RLO2s can be mounted in the same cabinet.
- The MicroPDP-11 can be mounted in any position in the rack as long as there is an inch or more of clearance between its sides and any other barrier.
- When a cabinet containing a MicroPDP-11 is placed side-to-side in multiple cabinet configurations, care should be taken to ensure that the side-to-side air flow of the MicroPDP-11 does not conflict with the device in the adjacent cabinet.

MicroPDP-11 Country Kits

MicroPDP-11 country kits include a checkout diskette, documentation, and labels. Power cables, null modem cable, and miscellaneous hardware are shipped with the hardware and are no longer included in the country kits.

**MicroPDP-11 Country Kit
Order Codes**

Option		Order Code
MicroPDP-11 Country Kit		BQO1-A*
*Replace the asterisk in the country kit order code with the letter that precedes the desired country/ language listed below.		
F—Finland	D—Denmark	E—United Kingdom
I—Italy	G—Germany	H—Netherlands
M—Sweden	K—French-speaking Switzerland	L—German-speaking Switzerland
S—Spain	N—Norway	P—France

Ordering Information

Base and Box Systems

Option	Order Code
MicroPDP-11/23 Floor/Table System Base. Includes CPU, 256-Kbyte parity MOS memory, and RX50 dual diskette.	11A23-F
MicroPDP-11/23 Rackmount Model. Includes CPU, 256-Kbyte parity MOS memory, and RX50 dual diskette.	11A23-R
MicroPDP-11/23 Floor/Table System Base. Includes CPU, 256-Kbyte parity MOS memory, RX50 dual diskette, and RD51 Winchester disk.	11C23-F
MicroPDP-11/23 Rackmount Model. Includes CPU, 256-Kbyte parity MOS memory, RX50 dual diskette, and RD51 Winchester disk.	11C23-R
MicroPDP-11/23 Floor/Table System Base. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD51 Winchester disk.	11C23-FE
MicroPDP-11/23 Rackmount model. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD51 Winchester disk.	11C23-RE
MicroPDP-11/23 Floor/Table System Base. Includes CPU, 256-Kbyte parity MOS memory, RX50 dual diskette, and RD52 Winchester disk.	11E23-FD
MicroPDP-11/23 Rackmount model. Includes CPU, 256-Kbyte parity MOS memory, RX50 dual diskette, and RD52 Winchester disk.	11E23-RD
MicroPDP-11/23 Floor/Table System Base. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD52 Winchester disk.	11E23-FE
MicroPDP-11/23 Rackmount model. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD52 Winchester disk.	11E23-RE
MicroPDP-11/23 Rackmount System. Includes 512-Kbyte parity MOS memory and RC25 52-Mbyte fixed/removable disk, all in an H9642 cabinet.	11H23-AB

**MicroPDP-11/23 Packaged System
Order Codes**

Option	Order Code
MicroPDP-11/23 Floor/Table Packaged System. Includes CPU, 256-KB parity MOS memory, RX50 dual diskette, and RD51 Winchester disk, and DZV11 multiplexer for a total of six terminal ports.	SX-RA500-EX*
MicroPDP-11/23 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD51 Winchester disk, and DZV11 multiplexer for a total of six terminal ports.	SX-RA50E-EX*
MicroPDP-11/23 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, and RD52 Winchester disk, and DZV11 multiplexer for a total of six terminal ports.	SX-RA520-EN*
MicroPDP-11/23 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, RX50 dual diskette, RD52 Winchester disk, and RL02 removable disk, all in an H9642 cabinet.	SX-RA530-EN*
MicroPDP-11/23 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, DZV11-BD four-line asynchronous multiplexer and TQD25-EA 60-Mbyte streamer cartridge tape.	SX-RA52B-FN*

MicroPDP-11/73 Order Codes

Option	Order Code
MicroPDP-11 Rackmount model. Includes CPU, and 512-Kbyte parity MOS memory.	11/73-BD
MicroPDP-11/73 includes CPU, 512-Kbyte parity MOS memory, RC25 52-Mbyte disk: 26 fixed/26 removable, all in an H9642 cabinet.	11H73-AB
MicroPDP-11/73 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, DHV11 eight-line asynchronous multiplexer, 31-Mbyte Winchester disk, and RX50 dual diskette.	SX-EA52E-EN*
MicroPDP-11/73 Floor/Table Packaged System. Includes CPU, 512-Kbyte parity MOS memory, DHV11 eight-line asynchronous multiplexer, 31-Mbyte Winchester disk, and 60-Mbyte cartridge tape drive.	SX-EA54E-EN*

*Includes PDP-11 operating system general license

MicroPDP-11 **Site Preparation Specifications**

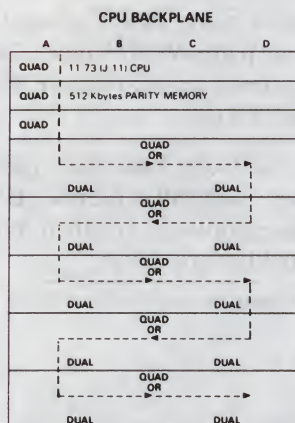
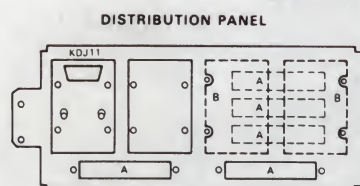
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173QY-B3	15.20	56.50	74.40	32.0	345
173QY-B3	[6.00]	[22.25]	[28.50]	[70.0]	345
SX-EA52E-EK	15.20	56.50	74.40	32.0	345
SX-EA52E-EK	[6.00]	[22.25]	[28.50]	[70.0]	345
SX-EA54E-EK	15.20	56.50	74.40	32.0	345
SX-EA54E-EK	[6.00]	[22.25]	[28.50]	[70.0]	345
11A23-F*	15.20	56.50	74.40	32.0	345
11A23-F*	[6.00]	[22.25]	[28.50]	[70.0]	345
11A23-R**	13.30	48.30	64.80	25.0	345
11A23-R**	[5.25]	[19.00]	[25.50]	[55.0]	345
11C23-F*	15.20	56.50	74.40	32.0	345
11C23-F*	[6.00]	[22.25]	[28.25]	[70.0]	345
11C23-R**	13.30	48.30	64.80	25.0	345
11C23-R**	[5.25]	[19.00]	[25.50]	[55.0]	345
11E23-F*	15.20	56.50	74.40	32.0	345
11E23-F*	[6.00]	[22.25]	[28.25]	[70.0]	345
11E23-R**	13.30	48.30	64.80	25.0	345
11E23-R**	[5.25]	[19.00]	[25.50]	[55.0]	345

*Any Floorstand/Tabletop MicroPDP-11/23

**Any Rackmount MicroPDP-11/23

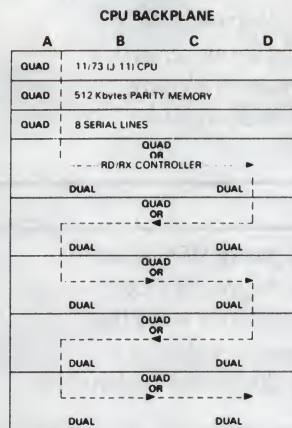
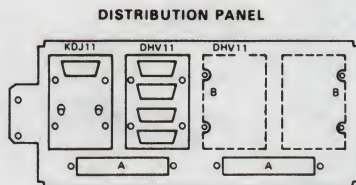
CONFIGURATION TEMPLATE

11/73



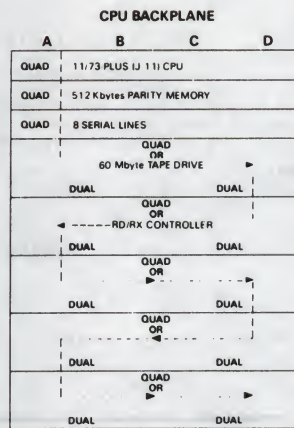
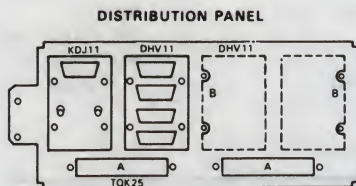
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		36		6		230		30
KDJ11 B	5 5	30 5	0 2	5 8	29 9	200 1	2 3	27 7
MSV11 PL	3 6	26 9		5 8	18	182 1	2	25 7

CONFIGURATION TEMPLATE SX-EA52E



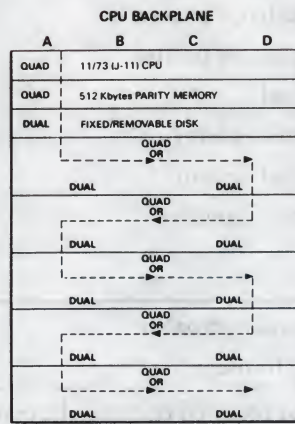
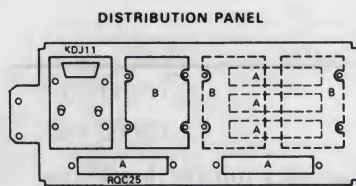
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RD52 RX50 AA	2.3	33.7	4.3	1.7	59.5	170.5		30
KDJ11 B	5.5	28.2	0.2	1.5	29.9	140.6	2.3	27.7
MSV11 PL	3.6	24.6		1.5	18	122.6	2	25.7
DHV11-AB	4.3	20.3	0.48	1.02	27.3	95.3	2.9	22.8
RQDX1	6.4	13.9	0.25	0.77	35	60.3	2	20.8

CONFIGURATION TEMPLATE SX-EA54E



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD52	1.5	34.5	2.5	3.5	33.9	196.1		30
KDJ11 B	5.5	29	0.2	3.3	29.9	166.2	2.3	27.7
MSV11 PL	3.6	25.4		3.3	18	148.2	2	25.7
DHV11-AB	4.3	21.1	0.48	3.82	27.3	120.9	2.9	22.8
TQK25 EA	4	17.1		2.82	20	100.9	2	20.8
RQDX1	6.4	10.7	0.25	2.57	35	65.9	2	18.8

CONFIGURATION TEMPLATE 11H73



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
	—	36	—	6	—	230	—	30
KDJ11-B	5.5	30.5	0.2	5.8	29.9	200.1	2.3	27.7
MSV11-PL	3.6	26.9	—	5.8	18	182.1	2	25.7
RQC25	3	23.9	—		15	167.1	2.3	23.4

MicroPDP-11/73 System (rackmount)**173QZ-B3**

In addition, you must order one each from the Mass Storage (System device and Load device) and System Packaging menus. Selection from the Communications device, Console terminal, and Software license menus is optional.

- 512-Kbyte parity MOS memory
- Bootstrap/diagnostic ROM
- One asynchronous serial line
- BA23-A system enclosure
- BA23A-AR rackmount kit

MicroPDP-11/73 System**173QY-B3**

- 512-Kbyte parity MOS memory
- Bootstrap/diagnostic ROM
- One asynchronous serial line
- BA23-A system enclosure
- BA23A-AF floorstand/tabletop kit

Mass Storage Order Codes
*Mandatory***Load Device**

The RX50 and TK25 can both be ordered on the same system

System Device		Order Codes
RD51 11 MB Fixed Winchester	RX50 Diskette	RQDX1
		CK-RQDX1-KA
	TK25 Cartridge Tape	RD51-A
		RX50-AA
RD52 31 MB Fixed Winchester	RX50 Diskette	RQDX1
		CK-RQDX1-KA
	TK25 Cartridge Tape	RD51-A
		TQK25-EA

Communication Device Order Codes
Optional

Eight-line multiplexer	DHV11-AB
Four-line multiplexer	DZV11-DB
Four-line multiplexer	DZQ11-DB

Console Terminal Order Codes
Optional

Tabletop hardcopy printer	LA100-BB
Tabletop hardcopy printer	LA12-DB
Video terminal	VT101-AB
Video terminal (white)	VT220-A3
Video terminal (green)	VT220-B3
Video Terminal (amber)	VT220-C3

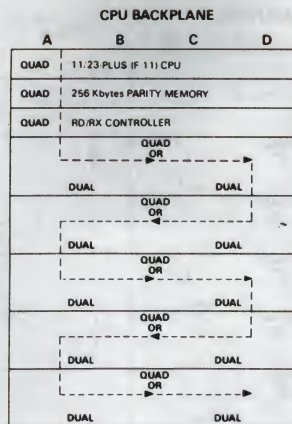
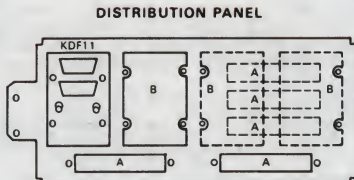
Software Order Codes
Optional

PDP-11 Operating System	QJB51-UZ
ULTRIX-11 (16-user)	QJO85-UZ

Although not required on SBBs, the country kit (customer-runable diagnostics, documentation, and labels) may be ordered separately.

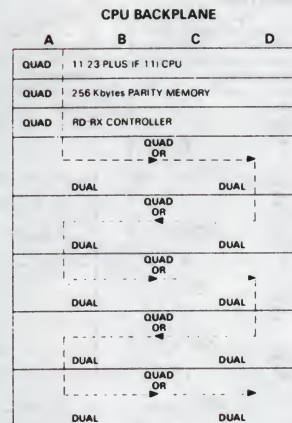
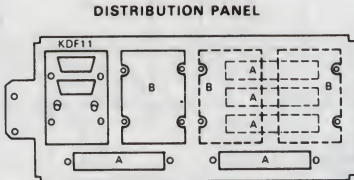
For MicroPDP-1/73 SBBs, the operating systems and customer-runable diagnostics are distributed on RX50 media only.

CONFIGURATION TEMPLATE 11A23-F, R



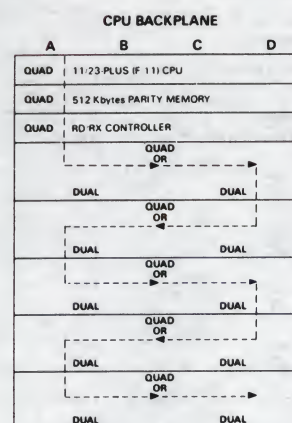
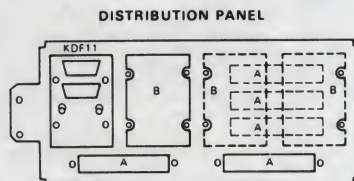
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RX50-AA	0.8	35.2	1.8	4.2	25.6	204.4	—	30
KDF11-BE	6.4	28.8	0.7	3.5	40.4	164	2	28
MSV11-PK	3.45	25.35	—	3.5	17.3	146.7	2	26
RQDX1	6.4	18.95	0.25	3.25	35	111.7	2	24
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CONFIGURATION TEMPLATE 11C23-F, R



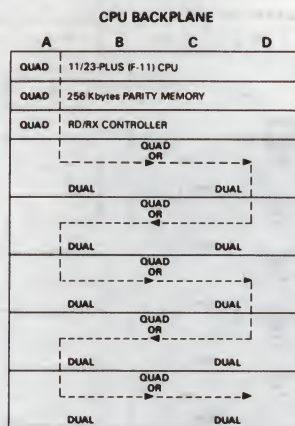
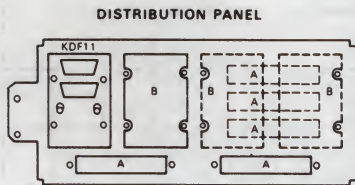
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	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD51 A RX50-AA	1.8	34.2	3.6	2.4	52.2	177.8		30
KDF11-BE	6.4	27.8	0.7	1.7	40.4	137.4	2	28
MSV11-PK	3.45	24.35		1.7	17.3	120.1	2	26
RQDX1	6.4	17.95	0.25	1.45	35	85.1	2	24
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CONFIGURATION TEMPLATE 11C23-FE, RE



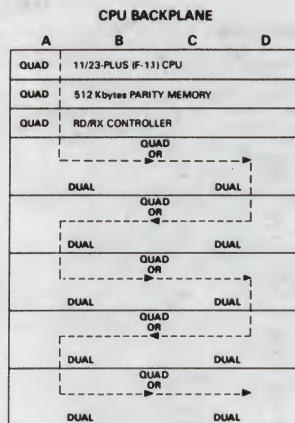
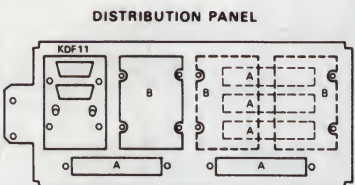
OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD51 A RX50-AA	1.8	34.2	3.6	2.4	52.2	177.8		30
KDF11-BE	6.4	27.8	0.7	1.7	40.4	137.4	2	28
MSV11-PL	3.6	24.2		2.7	18	119.4	2	26
RQDX1	6.4	17.8	0.25	1.45	35	85.4	2	24
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CONFIGURATION TEMPLATE 11E23-FD, RD



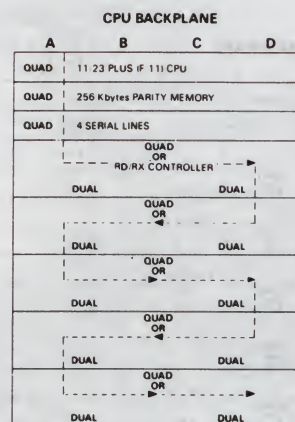
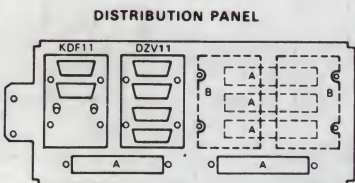
OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD52 RX50-AA	2.3	33.7	4.3	1.7	59.5	170.5	-	30
KDF11-BE	6.4	27.3	0.7	1	40.4	130.1	2	28
MSV11-PK	3.45	23.85	-	1	17.3	112.8	2	26
RQDX1	6.4	17.45	0.25	0.75	35	77.8	2	24

CONFIGURATION TEMPLATE 11E23-FE, RE



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD52 RX50-AA	2.3	33.7	4.3	1.7	59.5	170.5	-	30
KDF11-BE	6.4	27.3	0.7	1	40.4	130.1	2	28
MSV11-PL	3.6	23.7	-	2	18	112.1	2	26
RQDX1	6.4	17.3	0.25	0.75	35	77.1	2	24

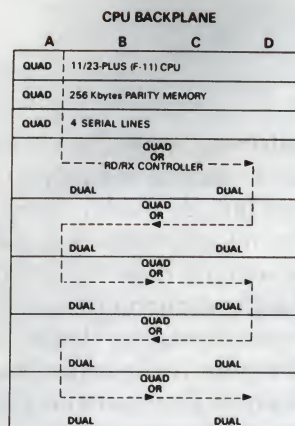
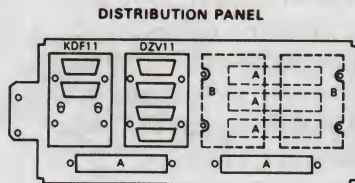
CONFIGURATION TEMPLATE SX-RA500-EX



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD51 A/RX50 AA	1.8	34.2	3.6	2.4	52.2	177.8	-	30
KDF11-BE	6.4	27.8	0.7	1.7	40.4	137.4	2	28
MSV11-PK	3.45	24.35	-	1.7	17.3	120.1	2	26
DZV11-DB	1.2	23.15	0.39	1.31	10.4	109.7	3.9	22.1
RQDX1	6.4	16.75	0.25	1.06	35	74.7	2	20.1

CONFIGURATION TEMPLATE

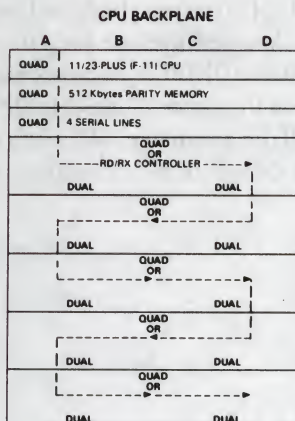
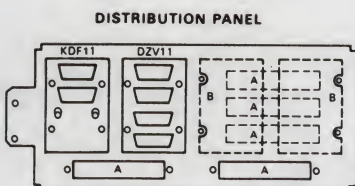
SX-RA50E-EX



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD51-A/RX50-AA	1.8	34.2	3.6	2.4	52.2	177.8	—	30
KDF11-BE	6.4	27.8	0.7	1.7	40.4	137.4	2	28
MSV11-PL	3.6	24.2	—	1.7	18	118.4	2	26
DZV11-DB	1.2	23	0.39	1.31	10.4	109	3.9	22.1
RDX1	6.4	16.6	0.25	1.06	35	74	2	20.1
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CONFIGURATION TEMPLATE

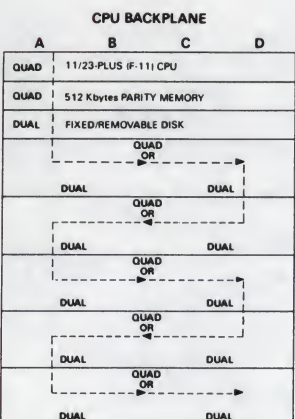
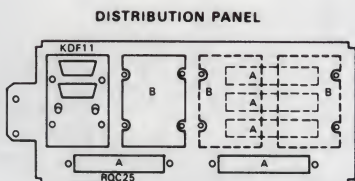
SX-RA520-EK (EN), JK



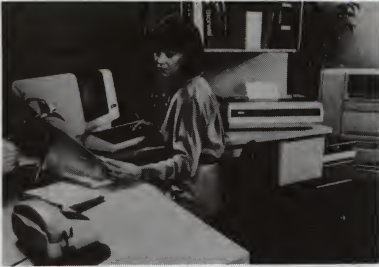
OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
RD52/RX50-AA	2.3	33.7	4.3	1.7	59.5	170.5	—	30
KDF11-BE	6.4	27.3	0.7	1	40.4	130.1	2	28
MSV11-PL	3.6	23.7	—	1	18	112.1	2	26
DZV11-DB	1.2	22.5	0.39	0.61	10.4	101.7	3.9	22.1
RDX1	6.4	16.1	0.25	0.36	35	66.7	2	20.1
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CONFIGURATION TEMPLATE

11H23



OPTION	AMPS AT +5V		AMPS AT +12V		WATTS		AC BUS LOADS	
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
—	—	36	—	6	—	230	—	30
KDF11-BE	6.4	29.6	0.7	5.3	40.4	189.6	2	28
MSV11-PL	3.6	26	—	5.3	18	171.6	2	26
RDC25	3	23	—	5.3	15	156.6	2.3	23.7
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Introduction

Today Digital offers the new, high-performance PDP-11/84 and the PDP-11/24 and PDP-11/44, based on its highly successful UNIBUS technology. Together these products provide a wide range of minicomputer solutions from small dedicated control, communications, and computational applications to larger business and scientific timesharing systems. The UNIBUS is a bidirectional, asynchronous interconnect that links these versatile processors with the industry's most comprehensive set of mass storage systems and communications interfaces. It provides the configuration flexibility and growth capacity that make these processors ideal solutions for a broad spectrum of applications.

The PDP-11/24, PDP-11/44, and the PDP-11/84 execute a common instruction set, run under the control of any of Digital's PDP-11 operating systems, and make available the problem solving power of Digital's proven languages, data management, communications and networking products.

PDP-11/84 Highlights

The PDP-11/84 is the new, high-end member of the PDP family. It delivers PDP-11/70 class performance for a fraction of the cost—it is the most powerful, yet cost-effective UNIBUS processor ever designed. The PDP-11/84 is uniquely suited to span the entire range of traditional PDP-11 applications. It effectively combines all the advantages of today's technology with a proven architecture and more than a decade of system engineering enhancements.

PDP-11/84 Features

- Powerful, high-performance single board CPU features Digital's new 18-Megahertz J-11 chipset
- The full PDP-11 instruction set including floating-point and EIS instructions, plus integral floating-point accelerator (all standard)
- Sophisticated 22-bit memory management, dual register set, separate instruction and data space, and three system modes: kernel, supervisor, and user
- Large 8-Kbyte CPU cache memory speeds program execution
- 1 or 2 Mbytes of memory, memory expansion to 4 Mbytes with high-density ECC MOS memory
- Private Memory Interconnect architecture for high-speed data transfers between CPU and memory
- 32-Kbyte bootstrap diagnostic ROM facility and 8 Kbyte EEPROM
- Program-controlled line-frequency clock
- One switch-selectable EIA/CCITT serial-line asynchronous interface for console terminal connection.
- ASCII console logic for system control and debugging with optional console terminal
- High-speed DMA cache that delivers faster memory access for DMA peripheral devices
- Concurrent processing that allows the simultaneous execution of instructions and DMA transfers
- Programmable bus management that offers the CPU bus mastership regardless of pending DMA I/O requests
- Compact design that requires less power and less floor space than comparable system configurations
- Standard 12-slot backplane that offers 8 to 17 slots for system option expansion depending on the enclosure
- Compatibility with the industry's most comprehensive set of mass storage subsystems, communication interfaces, and special purpose I/O devices
- Modular design and system building-block packaging scheme that maximizes configuration flexibility and growth opportunities; FCC Class A enclosures
- Support by industry's most extensive collection of system and application software including all PDP-11 operating systems and ULTRIX-11, plus a full complement of high-level languages and development tools, and more than 2,000 application packages.

The PDP-11/24 was designed to provide the basis for compact, low-cost application solutions. Its features include a single-board CPU with space for optional commercial instruction set (CIS) and floating-point processor (FPP) chips. It offers an optional hardware floating-point processor that delivers up to six times the performance of the FPP chip. The PDP-11/24 provides sophisticated memory management and the KT24 4 Mbyte extended memory addressing option. These features combine to give the PDP-11/24 capabilities that were previously available only on larger, more powerful PDP-11s.

The PDP-11/44 delivers more than twice the performance of the PDP-11/24, and is ideally suited for large departmental level applications. The PDP-11/44 features an 8 Kbytes high-speed cache memory, standard 22-bit extended memory addressing, separate instruction and data address space support and three operating modes. In addition, the PDP-11/44 offers high performance hardware commercial instruction set and floating-point processor options.

The standard features of all PDP-11/24s and PDP-11/44s are highlighted below. More detailed information is included in the individual system descriptions.

11/24 Features

- Single board CPU with power supply
- 1 MB ECC MOS memory
- Memory expansion up to 4 MB in 1 MB increments (10.5 in box)
- Sophisticated memory management
- Two operating modes—kernel and user
- Integral bootstrap with diagnostics
- ASCII console logic
- Line frequency clock
- Two-serial line asynchronous EIA/CCITT interfaces; one for the console terminal and one for expansion
- Nine-slot backplane
- 13.3 cm (5.25 in) or 26.6 cm (10.5 in) box

11/44 Features

- High performance CPU with power supply
- 8 KB high-speed cache memory
- 1 MB ECC MOS memory
- Memory expansion up to 4 MB in 1 MB increments
- Sophisticated memory management unit
- Three operating modes: kernel, supervisor, and user
- Separate instruction and data address space
- ASCII console logic
- Bootstrap with diagnostics
- Line frequency clock
- Two serial-line asynchronous EIA/CCITT interfaces; one for the console terminal and one for expansion
- DC voltage monitor
- 14-slot backplane
- 26.6 cm (10.5 in) box

Both the PDP-11/24 and the PDP-11/44:

- Provide high performance floating-point and commercial instruction set processor options
- Offer memory expansion up to 4 MB for enhanced and realtime performance (10.5 in box)
- Permit memory expansion in 1 MB increments (10.5 in box)
- Support the microprocessor-based network communications option for comprehensive system configuration and resource sharing
- Offer enhanced system reliability and availability through self-diagnostics and power monitoring, and optional battery backup and auto restart
- Include ASCII console logic for system control/debugging with optional console terminal
- Include two EIA/CCITT serial interfaces: one for the console terminal and one for expansion
- Provide compatibility with existing UNIBUS peripheral devices for smooth system upgrades
- Offer unmatched configuration flexibility and system growth capacity

The PDP-11/24, PDP-11/44, and the PDP-11/84 are available in four levels of integration:

- The **Rackmountable Computers** provide significant expansion space and memory expansion up to 4 MB (10.5 in box).
- The cabinet-mounted **Kernel Computers** provide a base for OEM system integration.
- The **System Building Blocks (SBB)** allow the choice of system and load devices form a variety of disk and tape subsystems and include the PDP-11 Operating System General License (DHU11 standard on PDP-11/84).
- The **Packaged Systems** include all the necessary hardware and software components (except for the console terminal) for a complete system. These systems are based on PDP-11/24, 11/44, and 11/84 SBB configurations.

System	Height cm [in]	Width cm [in]	Depth cm [in]	Weight kg [lb]	Watts	BTUs/hr. Maximum
1123-SE	8.90 [3.50]	48.3 [19.0]	38.1 [15.0]	18.1 [40.0]	150	510 510
1124-CD	13.30 [5.25]	42.2 [16.6]	69.0 [26.0]	20.0 [45.0]	176	1700 1700
1124-DD	26.30 [10.40]	42.2 [16.6]	69.0 [26.0]	40.9 [90.0]	262	4600 4600
1144-DB	26.30 [10.40]	42.2 [16.6]	69.0 [26.0]	42.2 [93.0]	379	4600 4600
11X24-FB	106.00 [41.70]	54.1 [21.3]	80.0 [31.5]	135.0 [298.0]	262	4600 4600
11X44-FB	106.00 [41.70]	54.1 [21.3]	80.0 [31.5]	137.0 [302.0]	379	4600 4600
SX-FX200-EN	106.00 [41.70]	73.6 [29.0]	80.0 [31.5]	162.0 [358.0]	379	4600 4600
SX-40200-EN	106.00 [41.70]	73.6 [29.0]	80.0 [31.5]	162.0 [358.0]	262	4600 4600
SX-FXMMB-EN	106.00 [41.70]	73.6 [29.0]	80.0 [31.5]	230.0 [506.0]	544	5100 5100
SX-FXGMB-EN	106.00 [41.70]	73.6 [29.0]	76.2 [30.0]	264.0 [582.0]	1240	7650 7650
SX-40MMB-EN	106.00 [41.70]	73.6 [29.0]	76.2 [30.0]	264.0 [582.0]	640	5100 5100
SX-40GMB-EN	106.00 [41.70]	73.6 [29.0]	80.0 [31.5]	266.0 [586.0]	1360	7650 7650

UNIBUS Options Checklist

The following is a list of system options for the PDP-11/24, PDP-11/44, and the PDP-11/84 systems. These options may also be ordered as field upgrades: order a base option and cabinet kit. The options and all ordering details are described in the **Options** and in the **Disks and Tapes** sections of this catalog.

<i>PDP-11/24 Processor Options</i>	Floating-Point Chip	KEF11-AA
	Commercial Instruction Set	KEF11-BB
	Floating-Point Processor	FPF11
<i>PDP-11/44 Processor Options</i>	Commercial Instruction Set	KE44-A
	Floating-Point Processor	FP11-F
<i>PDP-11/24 Memory Options</i>	256 Kbyte ECC MOS memory	MS11-LD
	1 Mbyte ECC MOS memory	MS11-PB
	Physical Address Extension Module	KT24
<i>PDP-11/44 Memory Options</i>	1 Mbyte ECC MOS memory	MS11-PB
<i>PDP-11/84 Memory Options</i>	1 Mbyte ECC MOS memory (PMI)	MSV11-JB
	2 Mbyte ECC MOS memory (PMI)	MSV11-JC
<i>Communication Options</i>	EIA interface (modem control)	DL11-AP
	20 mA serial-line interface	DL11-HP
	EIA/CCITT serial-line interface (RS232-C, modem control)	DL11-DP
	16-line asynchronous DMA multiplexer	DHU11-AP
	Full- or half-duplex synchronous interface (modem control)	DUP11-AP
	DECnet point-to-point interface (RS232-C)	DMR11-AP
	DECnet point-to-point interface (RS423/CCITT V.24)	DMR11-FP
	DECnet point-to-point interface (V.35/DDS)	DMR11-BP
	DECnet point-to-point interface (integral modem)	DMR11-CP
	DECnet point-to-point interface (RS422/CCITT V.24)	DMR11-EP
	DECnet multipoint interface (RS232-C)	DMP11-AP
	DECnet multipoint interface (RS423/CCITT V.24)	DMP11-FP
	DECnet multipoint interface (V.35/DDS)	DMP11-BP
	DECnet multipoint interface (integral modem)	DMP11-CP
	DECnet multipoint interface (RS422/CCITT V.24)	DMP11-EP
	Multipoint parallel interface	PCL11-B
	8-line synchronous communications front-end processor	KMS11-BD
	Ethernet communication controller	DEUNA-AA
<i>Realtime Options</i>	Parallel interface	DR11-C
	General purpose DMA parallel interface	DR11-W
	48 channel output module	DRS11-A
	48 channel output module with open collector drivers	DRS11-B
	Optically isolated DC drivers with open collectors	DRS11-MP
	Alternate buffer interface with TTL drivers	DRU11-CC
	Alternate buffer interface with differential drivers	DRU11-CD
	Digital input device (TTL)	DSS11-A
	Digital input device	DSS11-B
	Contact sense input	DSS11-MP
	IEEE-488 UNIBUS interface	IEC11-AB
	UNIBUS to dual IEEE-488 interface	IEU11
	Programmable realtime clock	KW11-P

Peripherals Options

121 Mbyte fixed Winchester disk	RUA80-AA
456 Mbyte fixed Winchester disk	RUA81-AA
205 Mbyte removable disk	RUA60-CA
UNIBUS controller for .8 Mbyte dual diskette	RUX50
UNIBUS controller and 26 Mbyte fixed/26 Mbyte removable disk	RUC25
10 Mbyte cartridge disk	RL211-AK
Dual 8-inch floppy diskette subsystem (1 Mbyte)	RX211-BK
Magnetic tape (25/100 in/s)	TU80-AA
Magnetic tape (45 in/s)	TJE16-AA
Magnetic tape (125 in/s)	TJU77-AB
Cartridge tape (30 in/s)	TU58-DA

PDP-11/24 and 11/44 Unique Options

Battery backup option (11/24 and 11/44)	H7750
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PDP-11/84 Unique Options

11X84 battery backup option	H7231-E
11/84 battery backup option	H7231-F

UNIBUS Expansion Hardware

Rackmountable expansion box	BA11-KU(KV)
Four-slot expansion backplane	DD11-CK
Nine-slot expansion backplane	DD11-DK
Standard partitioned UNIBUS system expansion cabinet, includes shielded mounting space for BA11-KU, and one 10.5 in device options; provides 13 IOCP panel inserts	H9642-FA/FB
Standard unpartitioned UNIBUS system expansion cabinet includes mounting space for a BA11-KU; provides 29 IOCP panel inserts	H9642-FC/FD

Model	Memory	Mass Storage Included	Enclosure	License Included
11/24-CD	1 MB	None	13.3 cm (5.25 in) Rackmount	No
11/24-DD	1 MB	None	26.6 cm (10.5 in) Rackmount	No
11X24-FB	1 MB	None	H9642-EB Cabinet	No
SX-FX200-EN	1 MB	None	H9645-EB Cabinet	Yes
SX-FXGMB-EN	1 MB	121 MB Winchester 10.4 MB Cartridge Disk	H9645-EB Cabinet	Yes
SX-FXMMB-EN	1 MB	20.8 MB Cartridge Disk	H9645-EB Cabinet	Yes
11/44-DB	1 MB	None	26.6 cm (10.5 in) Rackmount	No
11X44-FB	1 MB	None	H9642-EB Cabinet	No
SX-40200-EN	1 MB	None	H9645-EB Cabinet	Yes
SX-40GMB-EN	1 MB	121 MB Winchester 10.4 MB Cartridge Disk	H9645-EB Cabinet	Yes
SX-40MMB-EN	1 MB	20.8 MB Cartridge Disk	H9645-EB Cabinet	Yes

System Products and Configuration

Today UNIBUS system products are offered at three levels of integration: Kernel Computer, System Building Blocks, and Packaged Systems. The PDP-11/24, PDP-11/44, and PDP-11/84 product variations offered at each level provide a foundation for building system configurations that offer unmatched configuration flexibility and growth capacity.

The kernel computers shown here provide a hardware base for OEM system integration. The packaged systems include all the necessary hardware and software components for a complete system with the exception of a console terminal. System building block products offer yet another measure of economy configuration flexibility. They allow a choice of system and load devices from a wide variety of disk and tape subsystems and they include the PDP-11 Operating System General License.

I/O Connection Panel

Along with the EMI/RFI advantages of today's UNIBUS systems packaging come some new configuration considerations. The most important of these is the I/O Connection Panel (IOCP). The IOCP provides the transition between internal cabling and the external shielded cabling to the peripheral devices. All cables that enter or exit cabinets must pass through the IOCP.

The I/O device connections are made with three components—an internal cable that originates at the option module or controller, a shielded external cable from the I/O panel to the peripheral, and a Connection Insert that mounts in the IOCP and joins the internal and external cables. With the IOCP, the Connection Insert provides the shielding and filtering necessary to contain potential interference within the cabinet.

The IOCP is provided as part of the CPU system cabinet. The Connection Insert and internal cable are provided with the specific option. The capacity of the I/O panel varies with the cabinet and CPU type. The type and style of inserts varies depending on the amount and type of connectors required by the option. Each I/O Connection Panel accepts multiple inserts. Unused IOCP space is filled with blank inserts to maintain shielding integrity.

System Building Blocks

System Building Blocks allow you to take maximum advantage of Digital's packaging flexibility and to help keep the physical size and price of a system configuration to a minimum. With system Building Blocks it is easy to order a system configuration that matches your precise requirements. The menu below is intended to provide a checklist of recommended storage and console terminal options for today's UNIBUS System Building Blocks.

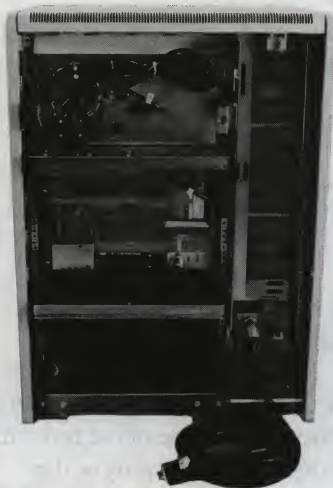
Consult the *Software Product Description* (SPD) for minimum configuring requirements. Also, a console terminal and at least one removable medium are required to install and service a system.

*PDP-11/84 Rackmountable
Shielded Enclosure (11/84)*

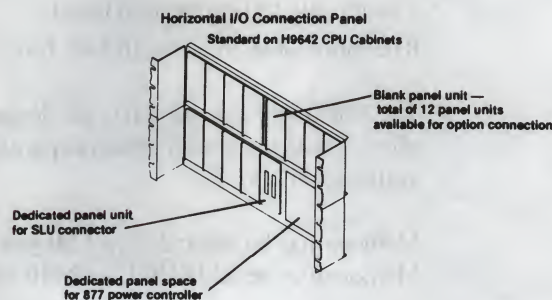
The PDP-11/84 box products are designed around a unique shielded 10.5 × 19 inch rackmount enclosure. These box product variations include the 11/84 CPU and either 1 or 2 Mbytes of memory. The box design includes an integral IOCP bulkhead that offers eight panel units for option connection at the rear of the box.

*PDP-11/84 Kernel System and
Building Block Configurations
(11X84 and SX-JX100)*

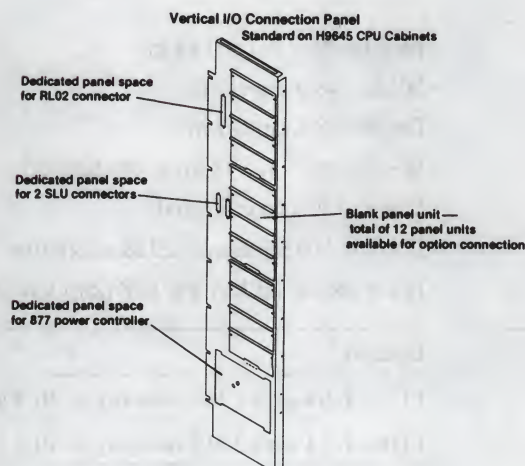
These PDP-11/84 product variations feature a unique, expandable open card cage design packaged in a 42-inch shielded cabinet. The base configurations include the 11/84 CPU and either 1 or 2 Mbytes of memory. The system building block product also includes a 16-line asynchronous multiplexer. All product variations offer 10.5 inches of mounting space in the top of the cabinet for device options. At the rear of the cabinet there is a large IOCP bulkhead that provides 24 panel units for option connection. These configurations are generally used to create large systems that include many disks, magnetic tapes, and/or many (more than 16) terminals or communication lines.



H9642-EA (EB)



H9645-EA (EB)





Product Description

The PDP-11/84 is offered in two rackmountable variations, providing either 1 Mbyte or 2 Mbytes of memory. These box configurations offer memory expansion to 4 Mbytes using MSV11-JC memory modules. The box design provides an EMI/RFI shielded enclosure with eight panel units available for option connection at the back of the box.

Features

- PDP-11/84 CPU and 650-watt power supply
- 1 Mbyte (MSV11-JB) or 2 Mbytes (MSV11-JC) ECC MOS memory
- 12-slot backplane, 8 slots for system expansion
- 8 panel unit, I/O connection panel
- Rackmountable 26.6 cm (10.5 in) box

CPU Box Expansion

The PDP-11/84 box products are designed around a 12-slot backplane that offers 8 slots for system option expansion. An extended battery backup unit is available (H7231-F).

Memory Expansion

Memory may be expanded to 4 Mbytes using MSV11-JC memory modules. Memory may be added in 1- or 2 MB increments.

System Expansion

PDP-11/84 box products may be expanded by adding internal options and external mass storage. The UNIBUS may be extended outside of the box with a shielded UNIBUS cable without compromising the EMI integrity of the enclosure. The 11X84 is recommended for larger system configurations that must conform to FCC regulations.

Site Preparation Specifications

- Height: 26.7 cm (10.44 in)
- Width: 48.2 cm (19 in)
- Depth: 68.6 cm (27 in)
- Weight: 44.5 kg (98 lb) as configured
- Watts: 120 as configured
- Btu/hr: 410 minimum, 2218 maximum
- Receptacles: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

Option	Order Code
PDP-11/84 with 1 MB memory in 10.5 in box	11/84-AB
PDP-11/84 with 2 MB memory in 10.5 in box	11/84-BB

Product Description

The PDP-11/84 is offered in two system kernel configurations, providing either 1 Mbyte or 2 Mbytes of memory. These H9642-style product variations feature an expandable open card cage design surrounded by a shielded 42-inch H9642-style cabinet. They offer memory expansion to 4 Mbytes using MSV11-JC memory modules, and it provides two system units of additional backplane mounting space. This flexible design is complemented by 10.5 inches of mounting space in top of the cabinet for device options.

Features

- PDP-11/84 CPU and 1,032-watt power supply
- 1 MB (MSV11-JB) or 2 MB ECC MOS memory
- 12-slot backplane with 8 to 17 slots for system expansion (optional expansion backplanes not included)
- 24 panel unit I/O connection panel
- Standard 42-inch H9642-style cabinet with power controller
- 26.6 cm (10.5 in) mounting space at the top of the cabinet for mass storage options

CPU Cabinet Expansion

All PDP-11X84 system cabinet products provide two system units of space for backplane expansion. The standard 12-slot backplane can be extended with a DD11-CK or DD11-DK. Mounting space is provided for an optional H7231-E battery backup unit.

Memory Expansion

Memory may be expanded to 4 Mbytes using MSV11-JC memory modules.

Mass Storage Expansion

There is 26.6 cm (10.5 in) of mounting space in the top of the CPU cabinet for mounting disk or tape options. Additional expansion is provided via a BA11-K expansion box and H9642 expansion cabinets.

Site Preparation Specifications

- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 80 cm (31.5 in)
- Weight: 150 kg (331 lb) as configured
- Watts: 120 as configured
- Btu/hr: 410 minimum, 3519 maximum
- Receptacles: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

Option	Order Code
PDP-11X84 with 1 MB in H9642 cabinet	11X84-AB
PDP-11X84 with 2 MB in H9642 cabinet	11X84-BB

----- HEX OR QUAD UNIBUS OPTIONS[illegible]

Product Description

The PDP-11/84 is available in a standard system building block configuration. It offers all the standard features of the 2 Mbyte 11X84 kernel system and includes a 16-line asynchronous multiplexer and PDP-11 Operating System General License. The expansion mounting space in the top of the cabinet may be used for Digital mass storage devices or customer equipment. Select from the list of storage products included under Ordering Information. Order at least one removable media (tape or disk) for loading software and diagnostics. A console terminal should be ordered separately.

Features

- PDP-11/84 CPU and 1,032-watt power supply
- 2 MB of ECC MOS memory
- 16-line DHU11-AP
- 24 panel unit I/O connection panel
- BC220 EIA cable for console terminal
- PDP-11 Operating System General License
- Shielded H9642-style cabinet with power controller

CPU Cabinet Expansion

All PDP-11/84 system cabinet products provide two system units of mounting space for backplane expansion. The standard 12-slot backplane can be extended with a DD11-CK or DD11-DK to provide 8 to 21 slots of expansion space. Mounting space is provided for an optional H7231-E battery backup unit.

Memory Expansion

Memory may be expanded to 4 Mbytes using MSV11-JC memory modules.

Mass Storage Expansion

There is 26.6 cm (10.5 in) of mounting space in the top of the cabinet for mounting disk or tape options. Additional expansion is provided via a BA11-K expansion box and a H9642 expansion cabinet.

Site Preparation Specifications

- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 80 cm (31.5 in)
- Weight: 150 kg (331 lb) as configured
- Watts:
- Btu/hr:
- Receptacles: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

Option	Order Code
PDP-11/84 System Building Block with 2 MB of memory and a 16-line DHU11-AP	SX-JX100-EN

PDP-11/84 System Building Block

Option	DC Power								Bus Loads		Panel Units	
	Power		+ 5 Volts		+ 15 Volts		- 15 Volts		Loads used	Available	Used	Available
	Watts used	Available	Amps used	Available	Amps used	Available	Amps used	Available				
		400		60						20		24
11/84	120	280	13.4	46.6	.1	1.9	0	3	1	19		24
CPU												
1 or 2 MB												
UBA												
DHU11												
OPTIONAL DD11-CK OR DD11-DK		235		32		2		3				

Product Description

The PDP-11/84 Dual RC25 Packaged System configuration provides all the standard features of the 11X84 and the SX-JX100 packages. It also includes 104 Mbytes of storage (26 fixed/26 removable) in each of the two RC25 disk drives included in the configuration. Consult the *Software Product Description* (SPD) for the operating system selected to verify support as a distribution device. An additional device option may be required for distribution. (ULTRIX-11 is the only operating system that supports RC25 distribution today.)

Features

- PDP-11/84 CPU and 1,032-watt power supply
- 2 MB of ECC MOS memory
- 16-line DHU11-AP
- 24 panel unit I/O connection panel
- BC220 EIA cable for console terminal
- PDP-11 Operating System General License
- Shielded H9642-style cabinet with power controller
- 104 MB of storage (26 fixed/26 removable in each of the RC25 drives)

CPU Cabinet Expansion

All PDP-11X84 system cabinet products provide two system units of mounting space for backplane expansion. The standard 12-slot backplane can be extended with a DD11-CK or DD11-DK. Mounting space is provided for an optional H7231-E battery backup unit.

Memory Expansion

Memory may be expanded to 4 Mbytes using MSV11-JV memory modules.

Mass Storage Expansion

The RUC25 controller supports up to four drives. Additional mass storage options may be added via H9642 expansion cabinets.

Site Preparation Specifications

- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 80 cm (31.5 in)
- Weight: 196 kg (431 lb) as configured
- Watts:
- Btu/hr:
- Receptacles: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

Option	Order Code
PDP-11/84 Dual RC25 system with 1 MB of memory and a 16-line DHU11-AP	SX-JXNNA-EN

PDP-11/84 Dual RC25 System Power Configuration

Option	DC Power								Bus Loads		Panel Units	
	Power		+ 5 Volts		+ 15 Volts		- 15 Volts		Loads used	Available	Used	Available
	Watts used	Available	Amps used	Available	Amps used	Available	Amps used	Available				
		400		60		2		3		20		24
11/84	120	280	13.4	46.6	.1	1.9	0	3	1	19		24
CPU												
1 or 2 MB												
UBA												
OPTIONAL DD 11-CK OR DD 11-DK		235		32		2		3				

Product Description

The PDP-11/84 RA81/TU80 Packaged System provides all of the standard features of the 11X84 and SX-JX100 configurations. It also includes a 456-Mbyte fixed disk subsystem and a 40-Mbyte magnetic tape drive. Consult the *Software Product Description* (SPD) for the operating system selected to verify distribution device option support.

Features

- PDP-11 CPU and 1,032-watt power supply
- 2 MB of ECC MOS memory
- 16-line DHU11-AP
- 24 panel unit I/O connection panel
- BC220 EIA cable for console terminal
- PDP-11 Operating System General License
- Shielded H9642-style cabinet with power controller
- 456 MB RA81 mass storage subsystem
- 40 MB TU80 magnetic tape drive

CPU Cabinet Expansion

All PDP-11X84 system cabinet products provide two system units of mounting space for backplane expansion. The standard 12-slot backplane can be extended with a DD11-CK or DD11-DK. Mounting space is provided for an optional H7231-E battery backup unit.

Memory Expansion

Memory may be expanded to 4 MB using MSV11-JC memory modules.

Mass Storage Expansion

The UDA50 disk controller supports up to four drives. Additional mass storage options may be added with H9642 expansion cabinets. There is 10.5 inches of mounting space available in the top of the cabinet.

Site Preparation Specifications

- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 80 cm (31.5 in)
- Weight:
- Watts:
- Btu/hr:
- Receptacles: NEMA #6-15R (240 Vac/50 Hz)

Ordering Information

Option	Order Code
PDP-11/84 RA81/TU80 system with 2 MB of memory and a 16-line DHU11-AP	SX-JXEDA-EN



Product Description

The PDP-11/44 building block consists of a 26.6-centimeter (10.5-inch) box computer, a cabinet with power controller, and the PDP-11 Operating System General License. The cabinet (H9645) provides expansion mounting space for two 26.6-centimeter (10.5-inch) or 13.3-centimeter (5.25-inch) devices. The expansion mounting space may be used for Digital mass storage devices or customer equipment. Select from the list of storage products included under ordering information. Be sure to order at least one removable medium (tape or disk) to permit loading software and diagnostics.

The PDP-11/44 Building Blocks include:

- CPU and power supply
- One-Mbyte ECC MOS memory (MS11-PB)
- I/O Connection Panel
- PDP-11 Operating System General License
- BC22D EIA cable for console terminal
- H9645-EB cabinet with power controller

Hardware

PDP-11/44 SBB Order Code

Option	Order Code
PDP-11/44 System Building Block in H9645-EB cabinet that accommodates any combination of <i>two</i> TU58s, RL02s or RX02s, but <i>not</i> two RA80/RA81s.	SX-40200-EN

Mass Storage Order Codes

Select the system device that is required. Then select the load device. Remember it is mandatory to have one of each in any system. Then use the order numbers shown on the master order form.

The number in parenthesis shows the number of cabinets in which the ordered system will be housed.

Load Device					
Disk/Tape (NRZI = 800 b/in, PE = 1,600 b/in)					
System Device	TU80 Magtape PE	TU77 Magtape NRZI/PE	TE16 Magtape NRZI/PE	RL02 10 MB Cartridge Disk	None
RA80 121 MB (Fixed Disk)	RU80-AD TU80-AB (2)	RU80-AD TJU77-AD (2)	RU80-AD TJE16-AD (2)	RU80-AD RL211-AK (1)	
RA60 205 MB (Removable Disk)	RUA60-CD TU80-AB (3)	RUA60-CD TJU77-AD (3)	RUA60-CD TJE16-AD (3)	RUA60-CD RL211-AK (2)	
RA81 456 MB (Fixed Disk)	RUA81-AD TU80-AB (2)	RUA81-AD TJU77-AD (2)	RUA81-AD TJE16-AD (2)	RUA81-AD RL211-AK (1)	
RL02 10 MB (Cartridge Disk)	RL211-AK TU80-AB (2)	RL211-AK TJU77-AD (2)	RL211-AK TJE16-AD (2)	RL211-AK RL02-AK (1)	
RX02 .5 MB (Floppy Disk)					RX211-BN** None (1)

**RT11 or micro/power pascal (only).

SX-40200- EN SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS		PANEL UNITS		
			@+5V		@+15V		@-15V						
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	
1	CIM			103.5		3		3		20		12	
	RESERVED FOR CIS	0	103.5	0	3	0	3	0	20	0	12		
	RESERVED FOR FLOATING POINT PROCESSOR	0	103.5	0	3	0	3	0	20	0	12		
	11/44 CPU	11/44 CPU	34	69.5	0	3	0	3	1	19	0	12	
		1 MB ECC MOS MEMORY	MS11-PB	4.8	64.7	0	3	0	3	0	19	0	12
		RESERVED FOR MEMORY											
RESERVED FOR MEMORY													
3	RESERVED FOR MEMORY												
	HEX SLOT												
	UNIBUS TERMINATOR	QUAD SLOT											
4	SU												
5	SU												
6	SU												

CARRY TO NEXT BOX ►

Note: Maximum memory capacity is four Mbytes. Each MS11-PB consumes zero bus loads on the PDP-11/44.

System units (SU) four thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



Product Description

The PDP-11/44 is a cabinet mounted computer built around the 11/44-DB box product and housed in an H9642 CPU cabinet. This model provides a foundation for building system configurations tailored for unique applications.

Hardware

- PDP-11/44 CPU and power supply
- One-Mbyte ECC MOS memory (MS11-PB)
- Three System Units of additional expansion space
- I/O Connection Panel
- H9642-EB cabinet with power controller
- 26.6-centimeter (10.5-inch) mounting space at the top of the cabinet which will accommodate one of the following mass storage devices: RA80, RA81, RL02, RX02, and TU58

11X44- FB SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS		PANEL UNITS	
			@+5V		@+15V		@-15V					
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
			103.5		3		3		20		12	
1	CIM		0	103.5	0	3	0	3	0	20	0	12
	RESERVED FOR CIS		0	103.5	0	3	0	3	0	20	0	12
	RESERVED FOR FLOATING POINT PROCESSOR											
	11/44 CPU	11/44 CPU	34	69.5	0	3	0	3	1	19	0	12
2	1 MB ECC MOS MEMORY	MS11-PB	4.8	64.7	0	3	0	3	0	19	0	12
	RESERVED FOR MEMORY				0	3	0	3	0	19	0	12
	RESERVED FOR MEMORY				0	3	0	3	0	19	0	12
3	RESERVED FOR MEMORY				0	3	0	3	0	19	0	12
	HEX SLOT											
	UNIBUS TERMINATOR	QUAD SLOT										
4	SU											
5	SU											
6	SU											

CARRY TO NEXT BOX ▶

CARRY TO NEXT BOX ►

Note: Maximum memory capacity is four Mbytes. Each MS11-PB consumes zero bus loads on the PDP-11/44.

System units (SU) four thru six can be used for module expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



Product Description

The PDP-11/44 is available in a 26.6-centimeter (10.5-inch) high rackmountable version. It offers memory expansion up to four Mbytes in the four pre-wired slots in the CPU backplane. The PDP-11/44 computer provides ample power and expansion space for configuration flexibility.

The PDP-11/44-DB includes the following:

- PDP-11/44 CPU and power supply
- One-Mbyte ECC MOS Memory (MS11-PB)
- Three System Units of additional expansion space plus one hex- and one quad-slot
- Rackmountable 26.6-centimeter (10.5-inch) box

Site Preparation Specifications

- Height: 26.3 cm (10.5 in)
- Width: 42.2 cm (16.6 in)
- Depth: 69 cm (26 in)
- Weight: 42.2 kg (93 lb) as configured
- Watts: 379 as configured
- Btu/hr: 1290 minimum, 4600 maximum
- Receptacles: NEMA #6-15R (240 VAC/50Hz)

11/44 CPU in a 26.6-centimeter (10.5-inch) rackmountable enclosure

11/44-DB

11/44- DB SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS	
			@+5V		@+15V		@-15V			
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
1	CIM			103.5		3		3		20
	RESERVED FOR CIS (KE44-A)		0	103.5	0	3	0	3	0	20
	RESERVED FOR FLOATING POINT PROCESSOR		0	103.5	0	3	0	3	0	20
2	11/44 CPU	11/44 CPU	34	69.5	0	3	0	3	1	19
	1 MB ECC MOS MEMORY	MS11-PB	4.8	64.7	0	3	0	3	0	19
	RESERVED FOR MEMORY				0	3	0	3	0	19
3	RESERVED FOR MEMORY				0	3	0	3	0	19
	RESERVED FOR MEMORY				0	3	0	3	0	19
	HEX SLOT									
4	UNIBUS TERMINATOR	QUAD SLOT								
	SU									
	SU									
5	SU									
	SU									
	SU									
6	SU									
CARRY TO NEXT BOX ►										

Note: Maximum memory capacity is four Mbytes. Each MS11-PB module consumes zero bus loads on the PDP-11/44.

System units (SU) four thru six can be used for module expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and allows two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and yields two quad- and seven-hex slots for expansion.

Product Description

The PDP-11/44 Dual RL02 system configuration provides all the standard features of the PDP-11/44-DB and 20.8 Mbytes of removable mass storage capacity.

Hardware

- PDP-11/44 CPU and power supply
- One-Mbyte ECC MOS memory (MS11-PB)
- H9645-EB cabinet with power controller
- Two RL02 10.4-Mbyte removable-cartridge disk drives and controller
- One BC22D-25 EIA cable for console terminal (console terminal not included)
- I/O Connection Panel
- PDP-11 Operating System General License
- KT24 Physical Address Extension (PAX) module

CPU Cabinet Expansion

The CPU cabinet provides expansion space for the optional H7750 battery backup unit, and the I/O Connection Panel provides mounting space for option panel inserts.

Memory Expansion

The PDP-11/44 CPU backplane provides four dedicated slots for memory expansion. In this configuration there are three slots available for memory expansion in one-Mbyte increments (maximum memory capacity is four Mbytes).

Mass Storage Expansion

The RL211 disk controller supports up to four RL02 drives. Two more RL02 drives may be added to this system. An additional H9642 cabinet is required.

SX-40MMB- EN SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS		PANEL UNITS	
			@+5V		@+15V		@-15V					
			USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE
1	CIM			103.5		3		3		20		12
	RESERVED FOR CIS	0	103.5	0	3	0	3	0	20	0	12	
	RESERVED FLOATING POINT PROCESSOR	0	103.5	0	3	0	3	0	20	0	12	
	11/44 CPU	11/44 CPU	34	69.5	0	3	0	3	1	19	0	12
2	1 MB MOS MEMORY	MS11-PB	4.8	64.7	0	3	0	3	0	19	0	12
	RESERVED FOR MEMORY							0	19	0	12	
	RESERVED FOR MEMORY							0	19	0	12	
	RESERVED FOR MEMORY							0	19	0	12	
3	CONTROLLER FOR RL02 DISK DRIVES	RL211	5		0.5		0.5		1	18	1	11
	UNIBUS TERMINATOR											
	QUAD SLOT											
4	SU											
5	SU											
6	SU											

CARRY TO NEXT BOX ►

CARRY TO NEXT BOX ►

Note: Maximum memory capacity is four Mbytes. Each MS11-PB consumes zero bus load on the PDP-11/44.

System units (SU) four thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



Product Description

The PDP-11/44 RA80/RL02 system provides all the standard features of the PDP-11/44-DB box product plus an expansion backplane and a 121-Mbyte fixed and a 10.4-Mbyte removable disk storage.

Hardware

- PDP-11/44 CPU and power supply
- One-Mbyte ECC MOS memory
- KT24 physical address extension (PAX0 module)
- DD11-DK 9-slot expansion backplane
- One 121-Mbyte RA80 disk drive and UDA50 controller
- One RL02 10.4-Mbyte removable cartridge disk drive and controller
- One BC22D-25 EIA cable for console terminal (console terminal not included)
- H9645-EB cabinet with power controller
- Four system units of additional expansion space
- I/O Connection Panel
- PDP-11 Operating System General License

CPU Cabinet Expansion

The CPU cabinet provides expansion space for an optional H7750 battery backup unit and the I/O Connection Panel provides mounting space for option panel inserts.

Memory Expansion

The CPU backplane provides three slots for memory expansion using MS11-PB modules (maximum memory capacity is four Mbytes).

Mass Storage

The RL02 and UDA50 disk controllers in this system can accommodate up to four drives each. Three RA80, RA81 or RA60 disk drives and three RL02 disk drives may be added. Additional H9642 disk cabinets are required.

**PDP-11/44 RA80/RL02 Package
Order Code**

Option

Order Code

PDP-11/44 RA80/RL02 System

SX-40GMB-EN

Note: Maximum memory capacity is four Mbytes. Each MS11-PB consumes zero bus load on the PDP-11/44.

System unit (SU) six can be used for system expansion by adding a DD11-CK backplane. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



Product Description

The PDP-11/24 building block consists of a 26.6-centimeter (10.5-inch) box computer, a cabinet with power controller, and the PDP-11 Operating System General License. The cabinet (H9645) provides expansion mounting space for two 26.6-centimeter (13.3-inch) or 13.3-centimeter (5.25-inch) devices. The expansion mounting space may be used for Digital mass storage devices or customer equipment. Select from the list of storage products included under ordering information. Be sure to order at least one removable medium (tape or disk) for loading software and diagnostics.

Hardware

- CPU and power supply
- One-MB ECC MOS memory (MS11-PB)
- I/O Connection Panel
- PDP-11 Operating System General License
- BC22D EIA cable for console terminal
- H9645-EB or H9645-EB CPU cabinet with power controller
- KT24 Physical Address Extension module
- 12 panel inserts for expansion

PDP-11/24 SBB Order Codes

Option	Order Code
PDP-11/24 System Building Block in H9645-EA (EB) cabinet that accomodates any combination of <i>two</i> TU58s, RL02s or RX02s, RA80s and RA81s, but <i>not</i> two RA80/RA81s.	SX-FX200-EN

Mass Storage Order Codes

Select the system device that is required. Then select the load device. Remember it is mandatory to have one of each in any system. Then use the order numbers shown on the master order form.

The number in parenthesis shows the number of cabinets in which the ordered system will be housed.

Load Device					
Disk/Tape (NRZI = 800 b/in, PE = 1,600 b/in)					
System Device	TU80 Magtape PE	TU77 Magtape NRZI/PE	TE16 Magtape NRZI/PE	RL02 10 MB Cartridge Disk	None
RA80 121 MB (Fixed Disk)	RU80-AD TU80-AB (2)	RU80-AD TJU77-AD (2)	RU80-AD TJE16-AD (2)	RU80-AD RL211-AK (1)	
RA60 205 MB (Removable Disk)	RUA60-CD TU80-AB (3)	RUA60-CD TJU77-AD (3)	RUA60-CD TJE16-AD (3)	RUA60-CD RL211-AK (2)	
RA81 456 MB (Fixed Disk)	RUA81-AD TU80-AB (2)	RUA81-AD TJU77-AD (2)	RUA81-AD TJE16-AD (2)	RUA81-AD RL211-AK (1)	
RL02 10 MB (Cartridge Disk)	RL211-AK TU80-AB (2)	RL211-AK TJU77-AD (2)	RL211-AK TJE16-AD (2)	RL211-AK RL02-AK (1)	
RX02 .5 MB (Floppy Disk)					RX211-BN** None (1)

**RT11 or micro/power pascal (only).

SX-FX200-EN SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS		PANEL UNITS	
			@+5V		@+15V		@-15V					
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
1	11/24 CPU BACKPLANE			103.5		3		3		20		12
		11/24	6	97.5	0.6	2.4	0.1	2.9	1	19	0	12
		KT24	4.5	93	.001	2.4	.001	2.9	1	18	0	12
		MS11-PB	4.8	88.2	0	2.4	0	2.9	1	17	0	12
2												
3		UNIBUS TERMINATOR										
		QUAD SLOT										
4		SU										
5		SU										
6		SU										

CARRY TO NEXT BOX ▶

CARRY TO NEXT BOX ►

Note: Maximum memory capacity is four-Mbytes using MS11-PB modules. The CPU box can accommodate both MS11-LD and MS11-PB modules, each consumes one bus load on the PDP-11/24.

The second slot in the PDP-11/24 backplane is occupied by and reserved for the Physical Address Extension (PAX) option, KT24.

System units (SU) three thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.

The PDP-11/24 is a cabinet mounted CPU that provides a foundation for building tailored system configurations and includes the 11/24-DD box product.

- PDP-11/24 CPU and power supply
- KT24 Physical Address Extension (PAX) module
- One-Mbyte ECC MOS memory (MS11-PB)
- Four System Units of additional expansion space
- I/O Connection Panel
- H9642-EB CPU cabinet with power controller
- 26.6-centimeter (10.5-inch) mounting space at the top of the cabinet that will accommodate one of the following mass storage devices: RA80, RA81, RL02, RX02, and TU58

11X24- FB SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS		PANEL UNITS	
			@+5V		@+15V		@-15V		USED	AVAIL-ABLE	USED	AVAIL-ABLE
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE				
				103.5		3		3		20		12
1	11/24 CPU	11/24	6	97.5	0.6	2.4	0.1	2.9	1	19	0	12
	PHYSICAL ADDRESS EXTENSION	KT24	4.5	93	.001	2.4	.001	2.9	1	18	0	12
	1 MB ECC MOS MEMORY	MS11-PB	4.8	88.2	0	2.4	0	2.9	1	17	0	12
2												
3	UNIBUS TERMINATOR											
	QUAD SLOT											
4	SU											
5	SU											
6	SU											

CARRY TO NEXT BOX ►

Note: Maximum memory capacity is four Mbytes using MS11-PB modules. The CPU box can accommodate both MS11-LD and MS11-PB modules, each consumes one bus load in the PDP-11/24.

The second slot in the PDP-11/24 backplane is occupied by and reserved for the Physical Address Extension (PAX) option, KT24.

System units (SU) three thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven-hex slots for expansion.

Product Description

The PDP-11/24 is available in a 26.6-centimeter (10.5-inch) high rackmountable variation that provides significantly more expansion space. This box configuration offers memory expansion to a maximum of four Mbytes using MS11-PB memory modules. Four additional SUs for mounting expansion backplanes are available.

The 11/24-DD includes the following:

- PDP-11/24 CPU and power supply
- KT24 Physical Address Extension (PAX) module
- One-Mbyte ECC MOS memory (MS11-PB)
- Four system units of additional expansion space
- Rackmountable 26.6-centimeter (10.5-inch) box

Site Preparation Specifications

- Height: 26.3 cm (10.4 in)
- Width: 42.2 cm (16.6 in)
- Depth: 69 cm (26 in)
- Weight: 40.9 kg (90 lb) as configured
- Watts: 262 as configured
- Btu/hr: 890 minimum, 4600 maximum
- Receptacles: NEMA #6-15R (240VAC/50Hz)

11/24 CPU in a 26.6-centimeter (10.5-inch) rackmountable enclosure

11/24-DD

11/24- DD SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS	
			@ +5V		@ +15V		@ -15V			
			USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE
11/24 CPU BACKPLANE	11/24 CPU	11/24	6	97.5	0.6	2.4	0.1	2.9	1	19
	PHYSICAL ADDRESS EXTENSION	KT24	4.5	93	.001	2.4	.001	2.9	1	18
	1 MB ECC MOS MEMORY	MS11-PB	4.8	88.2	0	2.4	0	2.9	1	17
UNIBUS TERMINATOR	QUAD SLOT									
SU										
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Note: Maximum memory capacity is four Mbytes using MS11-PB modules. The CPU box can accommodate both MS11-LD and MS11-PB modules, each consumes one bus load on the PDP-11/24.

The second slot in the PDP-11/24 backplane is occupied by and reserved for Physical Address Extension (PAX) option, KT24.

System units (SU) three thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



Product Description

The PDP-11/24 is offered in a 13.3-centimeter (5.25-inch) high rackmountable variation. This compact enclosure accommodates a maximum of one-Mbyte of memory.

The 11/24-CD includes the following:

- PDP-11/24 CPU and power supply
- KT24 Physical Address Extension (PAX) module
- One-Mbyte ECC MOS memory (MS11-PB)
- 13.3-centimeter (5.25-inch) rackmountable box

Site Preparation Specifications

- Height: 13.3 cm (5.25 in)
- Width: 42.2 cm (16.6 in)
- Depth: 69 cm (26 in)
- Weight: 20 kg (45 lb) as configured
- Watts: 176 as configured
- Btu/hr: 598 minimum, 1700 maximum
- Receptacles: NEMA #6-15R(240 VAC/50Hz)

11/24 CPU in a 13.3-centimeter (5.25-inch) rackmountable enclosure

11/24-CD

11/24- CD SYSTEM CONFIGURATOR

CPU BOX		OPTION	DC POWER						BUS LOADS	
			@ + 5V		@ + 15V		@ - 15V			
			USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE	USED	AVAIL- ABLE
1	11/24 CPU BACKPLANE	11/24 CPU	6	26	0.6	2.4	0.1	1.9	1	19
		PHYSICAL ADDRESS EXTENSION	4.5	21.5	.001	2.4	.001	1.9	1	18
		1 MB ECC MOS MEMORY	4.8	16.7	0	2.4	0	1.9	1	17
2	UNIBUS TERMINATOR	QUAD SLOT								

CARRY TO NEXT BOX ▶

Note: The power supply limits memory capacity to the included one Mbyte. Each memory module consumes one bus load on the PDP-11/24.

The memory's +5V auxilliary power requirements exceed the limits of the power supply and limit the capacity to three MS11-LDs or one MS11-PB.

The second slot in the PDP-11/24 backplane is occupied by and reserved for the Physical Address Extension (PAX) option, KT24.

For customers that own other versions of PDP-11/24 CPUs, they accomodate a maximum of three MS11-LD modules (with KT24). Each memory module consumes one bus load on the PDP-11/24.



Product Description

The PDP-11/24 Dual RL02 system configuration provides all the standard features of the PDP-11/24-DD box product plus 20.8 Mbytes of disk storage capacity.

Hardware

- PDP-11/24 CPU and power supply
- One-Mbyte ECC MOS memory (MS11-PB)
- Four System units of additional expansion space
- H9645-EB cabinet with power controller
- Two RL02 10.4-Mbyte removable-cartridge disk drives and controller
- One BC22D-25 EIA cable for a console terminal (console terminal not included)
- I/O Connection Panel
- PDP-11 Operating System General License

CPU Cabinet Expansion

The CPU cabinet provides side mounting space for an optional H7750 battery backup unit and the I/O Connection Panel provides mounting space for option panel inserts.

Memory Expansion

Three additional MS11-PB memory modules may be added for memory expansion in one-MB increments (maximum memory capacity is four Mbytes).

Mass Storage Expansion

The RL02 disk controller can accommodate up to four RL02 disk drives. Two additional drives may be added to this system configuration. An H9642 disk cabinet is required.

SX-FXMMB- EN SYSTEM CONFIGURATOR

		OPTION	DC POWER						BUS LOADS		PANEL UNITS	
			@+5V		@+15V		@-15V		USED	AVAIL-ABLE	USED	AVAIL-ABLE
			USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
				103.5		3		3.0		20		12
1	11/24 CPU	11/24	6	97.5	0.6	2.4	0.1	2.9	1	19	0	12
	PHYSICAL ADDRESS EXTENSION	KT24	4.5	93	.001	2.4	.001	2.9	1	18	0	12
	1 MB ECC MOS MEMORY	MS11-PB	4.8	88.2	0	2.4	0	2.9	1	17	0	12
	HEX SLOT											
	HEX SLOT											
	HEX SLOT											
2	HEX SLOT											
	CONTROLLER FOR RL02	RL211	5.0		0.5		0.5		1		1	
3	UNIBUS TERMINATOR											
	QUAD SLOT											
	SU											
	SU											
4	SU											
	SU											
5	SU											
	SU											
6	SU											
	SU											

CARRY TO NEXT BOX ►



Product Description

The PDP-11/24 RA80/RL02 configuration provides all the standard features of the PDP-11/24-DD box product and 121-Mbyte fixed and 10-Mbyte removable disk storage.

Hardware

- PDP-11/24 CPU and power supply
- One-Mbyte ECC MOS memory (MS11-PB)
- Four system units of additional expansion space
- One 121-Mbyte RA80 disk drive and UDA50 controller
- One 10.4-Mbyte RL02 removable-cartridge disk drive and controller
- H9645-EB cabinet with power controller
- One BC22D-25 EIA cable for a console terminal (console terminal not included)
- I/O Connection Panel
- PDP-11 Operating System General License
- KT24 Physical Address Extension (PAX) module

CPU Cabinet Expansion

The CPU cabinet provides side mounting space for an optional H7750 battery backup unit and the I/O Connection Panel provides mounting space for option panel inserts.

Memory Expansion

Additional MS11-PB memory modules may be added for memory expansion in one-Mbyte increments (maximum memory capacity is four Mbytes).

Mass Storage Expansion

The RA80 and RL02 controllers in this system can accommodate up to four drives each. Three RA80, RA81, or RA60 drives and three RL02 disk drives may be added. Additional H9642 disk cabinets are required.

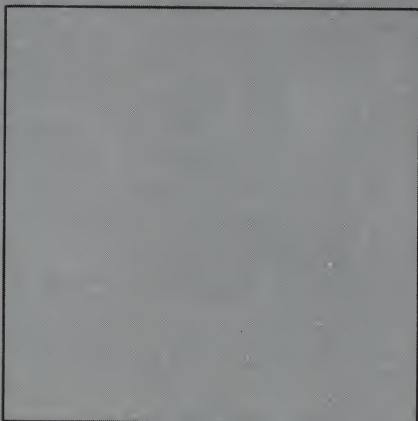
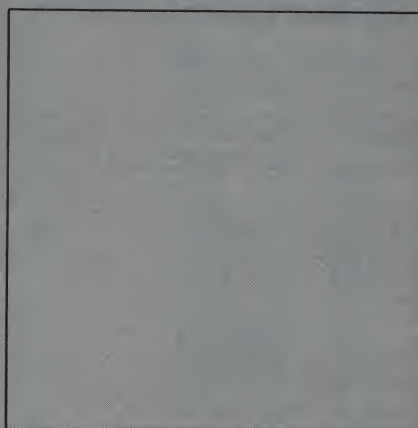
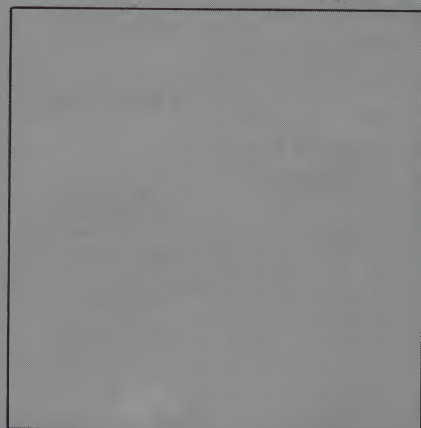
SX-FXGMB-EN SYSTEM CONFIGURATOR

CPU BOX		OPTION		DC POWER						BUS LOADS		PANEL UNITS	
				@+5V		@+15V		@-15V					
				USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
				103.5		3		3		20		12	
1	11/24 CPU BACKPLANE	11/24 CPU	6	97.5	0.6	2.4	0.1	2.9	1	19	0	12	
		PHYSICAL ADDRESS EXTENSION	KT24	4.5	93	.001	2.4	.001	2.9	1	18	0	12
		1 MB ECC MOS MEMORY	MS11-PB	4.8	88.2	0	2.4	0	2.9	1	17	0	12
		CONTROLLER FOR RL02	RL211	5	83.2	0.5	1.9	0.5	2.4	1	16	1	11
		HEX SLOT											
		HEX SLOT											
2		CONTROLLER FOR RA80	UDA50	12.75		.04		1.3		1		1	
		UNIBUS TERMINATOR	QUAD SLOT										
3		SU											
4		SU											
5		SU											
6		SU											
CARRY TO NEXT BOX ►													

Note: Maximum memory capacity is four Mbytes using MS11-PB modules. The CPU box can accommodate both MS11-LD and MS11-PB modules, each consumes one bus loads on the PDP-11/24.

The second slot in the PDP-11/24 backplane is occupied by and reserved for the Physical Address Extension (PAX) option, KT24.

System units (SU) three thru six can be used for system expansion by adding DD11-CK or DD11-DK backplanes. The DD11-CK occupies one SU and provides two quad- and two hex-slots for expansion. The DD11-DK occupies two SU and provides two quad- and seven hex-slots for expansion.



**Q-bus Processor Option
Order Codes**

Option	Order Code
Single- and double-precision fast floating-point hardware option. This option is one quad-module mounted adjacent to the CPU. Performs hardware operations on 32-bit and 64-bit floating-point numbers. Provides up to 17 digits of precision. Provides integer-to-floating-point conversions. Executes instructions approximately six times faster than the KEF11-AA.	FPF11
Single- and double-precision floating-point option. The micro-code to implement this option resides in two chips on one 40-pin package. Performs microcode operations on 32-bit and 64-bit floating-point numbers. Provides up to 17 digits of precision. Provides integer-to-floating-point conversions. Mounts on the CPU board.	KEF11-AA
Commercial instruction set (CIS). Implements a set of 27 commercial instructions on a variety of data types, including character strings, packed decimal, and numeric formats. Mounts on the CPU board.	KEF11-BB

Q-bus Memory Option Order Codes

Option	Order Code
32-Kbyte CMOS static Random Access Memory with on-board battery backup. This battery backup provides minimum data retention time of 50 days.	MCV11-DC
128-Kbyte MOS memory	MSV11-LF
256-Kbyte MOS memory	SV11-LK
256-Kbyte parity MOS memory	MSV11-PK
512-Kbyte parity MOS memory	MSV11-PL
1-Mbyte 64K Ram MOS memory	MSV11-QA
2-Mbyte 256K Ram MOS memory	MSV11-QB
4-Mbyte 256K Ram MOS memory	MSV11-QC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
FPF11	1 Quad Slot	5.5	0.0	27.5	N/A	N/A
MCV11-DC	1 Dual Slot	1.2	0.0	6.0	2.0	1.0
MSV11-LF	1 Dual Slot	3.9	0.0	14.0	2.0	1.0
MSV11-LK	1 Dual Slot	4.1	0.0	15.0	2.0	1.0
MSV11-PK	1 Quad Slot	3.5	0.0	17.3	2.0	1.0
MSV11-PL	1 Quad Slot	3.6	0.0	18.0	2.0	1.0

UNIBUS Processor Option
Order Codes

Option	Order Code
Single- and double-precision fast floating-point hardware option. This option is one quad-module mounted adjacent to the CPU. Performs hardware operations on 32-bit and 64-bit floating-point numbers. Provides up to 17 digits of precision. Provides integer-to-floating-point conversions. Executes instructions approximately six times faster than the KEF11-AA.	FPF11
Single- and double-precision floating-point option. The micro-code to implement this option resides in two chips on one 40-pin package. Performs microcode operations on 32-bit and 64-bit floating-point numbers. Provides up to 17 digits of precision. Provides integer-to-floating-point conversions. Mounts on the CPU board.	KEF11-AA
Commercial instruction set (CIS) for the PDP-11/24. Performs a set of 27 commercial instructions on a variety of data types, including character strings, packed decimal, and numeric formats. Mounts on the CPU board.	KEF11-BB
Floating-point processor for the PDP-11/44 with 46 floating-point instructions. Performs hardware operations on 32-bit and 64-bit floating-point numbers providing up to 17 digits of precision as well as integer to floating-point conversions. Mounts in a dedicated slot in the PDP-11/44 backplane.	FP11-F
Commercial instruction set (CIS) processor for the PDP-11/44. Performs 27 commercial instructions on a variety of data types, including character strings, packed decimal and numeric formats. Mounts in adjacent slots in the PDP-11/44 backplane.	KE44-A

UNIBUS Memory Order Codes

Option	Order Code
256-Kbyte ECC MOS memory for PDP-11/44	MS11-MB
256-Kbyte ECC MOS memory for PDP-11/24	MS11-LD
1-Mbyte ECC MOS memory for the PDP-11/24, 11/44.	MS11-PB
Physical address extension (PAX) module. Allows memory expansion to as much as one Mbyte with a 13.3-centimeter (5.25-inch) CPU box and as much as four Mbytes with a 26.6-centimeter (10.5-inch) CPU box.	
<i>Note:</i> The KT24 must mount in the second hex-slot in the CPU backplane next to the processor.	KT24
Battery backup for the 13.3-centimeter (5.25-inch) PDP-11/24. This battery backup provides minimum data retention time of 20 minutes.	H775-A
Battery backup for the 26.6-centimeter (10.5-inch) PDP-11/24 or the PDP-11/44. This battery backup provides minimum data retention time of 20 minutes.	H7750-BD

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
FP11-F	Dedicated Hex Slot	7.3	N/A	N/A	N/A	N/A
FPF11	1 Quad Slot	7.5	N/A	N/A	N/A	N/A
KE44-A	1 Hex Slot 1 Quad Slot	9.6	N/A	N/A	N/A	N/A
KT24	1 Hex Slot	4.5	N/A	N/A	1.0	1.0
MS11-LB	1 Hex Slot	4.8	N/A	N/A	1.0	1.0
MS11-LD	1 Hex Slot	4.8	N/A	N/A	1.0	1.0
MS11-MB	1 Hex Slot	4.8	N/A	N/A	1.0	1.0
MS11-PB	1 Hex Slot	4.8	N/A	N/A	1.0	1.0

VAX 11/780 Upgrade Order Code

Option

Order Code

VAX-11/780 processor unit, 2-Mbyte ECC MOS (64K chip) memory (MS780-ED), LA100 console terminal, two MBAs one UBA, H9652 UNIBUS Expansion Cabinet (includes BA11-K box, with DD11-KD backplane), VAX/VMS license.

Hardware Requirements: At least one system device (disk) and at least one load device (disk or tape) that is supported by the VAX/VMS operating system.

Expansion Information: The upgrade provides expansion space for seven hex-slots and two quad-slots, three system units, and an additional BA11-K expansion box.

11780-VD

VAX-11/750 Upgrade Order Code

Option

Order Code

VAX-11/750 with 1-Mbyte ECC MOS (64K chip) memory, TU58 magnetic tape cartridge, and VAX/VMS license. Software Services are not included but can be ordered separately. See the VAX-11/750 SBB Software menu.

Hardware Requirements: At least one system device (disk) and at least one load device (disk or tape) that are supported by the VAX/VMS operating system. There are seven hex-slots and two quad-slots available for expansion in the DD11-DK backplane. Expansion power available in the DD11-DK is 32.0 amps @ +5V, 2.0 amps @ +15V, and 3.5 amps @ -15V.

11750-VJ

**VAX 8600 Processor Option
Order Codes**

Option	Order Code
Second UNIBUS adapter (mounts in reserved space in CPU cabinet)	DW780-MB
Second SBI adapter (mounts in reserved space in CPU cabinet)	DB86-AA

**VAX-11/785 Processor Option
Order Codes**

Option	Order Code
High-performance, floating-point accelerator for single- and double-precision floating-point instructions plus POLY, EMOD and MULL. Power supply is included.	FP785-AB

**VAX 8600, 11/785 & 780 Processor
Option Order Codes**

Option	Order Code
<p>The DR780, an intelligent, high-performance, general-purpose interface, can be used to connect customer-designed devices to a VAX 8600, VAX-11/785, or VAX-11/780, or to connect two VAX 8600, VAX-11/785, VAX-11/780 systems or to connect a VAX-11/750 with DR750. It includes interface logic, power supply, and a 7.6-meter (25-foot) cable. Features of the DR780 include a 6.67-Mbyte per second transfer rate (if memory is interleaved), command and data chaining, dynamic memory mapping, separate data and control paths (synchronous 32-bit parallel data transfer path and asynchronous 8-bit control path). Also included is a library of high-level language support routines and complete I/O driver logic.</p> <p><i>VAX-11/780 Series Configuring Requirements:</i> The DR780 requires one option panel space in either the CPU cabinet or the CPU expansion cabinet, H9652-HB. There is a limit of one DR780 per VAX-11/780 or VAX-11/785 system. The DR780 cannot be configured on systems that already include the MA780 multiport memory, or the CI780 computer interconnect. The cable from the user device to the DR780 can be as long as 24.4 meters (80 feet).</p> <p><i>VAX 8600 Configuring Requirements:</i> The DR780 requires one option panel space in an SBI expansion cabinet (H9652-CB) connected to the second optional SBI adapter. As many as four DR780 (only one DR780 if a CI780 is also connected) are supported. The cable from the user device to the to the DR780 can be as long as 24.4 meters (80 feet).</p>	DR780-FB
<p>VAX 8600, VAX-11/785, VAX-11/780 and VAX-11/782 adapter to the dual-path computer interconnect. The CI780 is a micro-coded intelligent option supported by DECnet-VAX and VMS. It is used in conjunction with the SC008-AC Star Coupler and a BNCIA-xx CI cable set.</p> <p><i>VAX-11/780 Series Configuring Requirements:</i> Requires one OPS for mounting. It cannot be configured on systems with a DR780.</p> <p><i>VAX 8600 Configuring Requirements:</i> The CI780 requires one option panel space (OPS) in an SBI expansion cabinet (H9652-CB) connected to the second optional SBI adapter. As many as two CI780 (only one CI780 if a DR780 is also connected) are supported. See VAX/VMS SPD for details on multiple CI780s on the second SBI.</p>	CI780-AB

Option	Order Code
The Star Coupler is the option to which all VAX-11/750, VAX-11/780 series, and VAX 8600 systems, and HSC50 controllers on the same computer interconnect are connected. The SC008 is a passive hub device providing a dual CI path and electrical isolation between CPU nodes. The SC008-AC supports up to eight nodes; the SC008-AD is the upgrade to support 9-16 nodes. Includes cabinet.	SC008-AC
Upgrade to Star Coupler. For nine to 16 nodes	SC008-AD
CI cable set—10 meters (32 feet)	BNCIA-10
CI cable set—20 meters (65 feet)	BNCIA-20
CI cable set—45 meters (145 feet)	BNCIA-45
UNIBUS Adapter. Power supply is included. (four maximum per system)	
<i>Prerequisites:</i> BA11-KV and DD11-CK or DK.	DW780-AB
High-performance, floating-point accelerator for single- and double-precision floating-point instructions plus POLY, EMOD and MULL. Power supply is included.	FP780-AB
Extended Range G ₊ and H ₊ floating-point data type option. Includes microcode, single user license and support hardware.	
<i>Prerequisite:</i> KU780-A, 2-Kbyte words (99-bit words) User Control Store.	KE780-A
2-Kwords (99-bit words) user control store. Fits in optional control store slot of standard KA780 backplane. Provides control store space for either or both the KE780-A extended range G ₊ and H ₊ floating-point data type option and the QE109-CY Microprogramming Tools option.	KU780-A
Microprogramming tools option. Includes single user license, source license, binaries and support kit for microassembler (MICRO-2), define file (VAXDEF), loader (MICLD), VAX-11/780 data path description, and documentation kit. Allows a programmer to assemble and load microprograms for the user writable control Store option.	
<i>Prerequisite:</i> KU780-A, 2-Kbyte words (99-bit words) user control store.	QE109-CY

VAX 8600 Memory Expansion Order Codes

Option	Order Code
4-Mbyte ECC MOS (256K-chip) expansion memory module. Mounts in the reserved memory section of the CPU cabinet.	MS86-BA
12-Mbyte ECC MOS (256K-chip) memory (three MS86-BAs). Mounts in the reserved memory section of the CPU cabinet.	MS86-BB
20-Mbyte ECC MOS (256-chip) memory (five MS86-BAs). Mounts in the reserved memory section of the CPU cabinet.	MS86-BC
40-Mbyte ECC MOS (256K-chip) memory (ten MS86-BAs).	MS86-BD

VAX-11/782 Memory Expansion Option Order Code

Option	Order Code
VAX-11/782 expansion memory subsystem—for expansion from four Mbytes to eight Mbytes. Includes one Mbyte of ECC MOS memory. 16K-chip dual memory controllers (one MA780-JB and one MA780-BB), battery backup, cache invalidate options, MA780 cabinet and power supplies. To expand MA780 memory subsystems order MS780-C (16K-chip) expansion memory.	MA780-KB

**VAX-11/785 and 780 CPU
Expansion Memory Order Codes**

Option	Order Code
2-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with MS780-E memory or MS780-E upgrade.	MS780-FA
4-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with MS780-E memory or MS780-E upgrade.	MS780-FB
6-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with MS780-E memory or MS780-E upgrade.	MS780-FC
1-Mbyte ECC MOS expansion memory (one 64-K chip array). <i>Prerequisite:</i> CPU with MS780-E memory or MS780-E upgrade. <i>Note:</i> The MS780-FD one-Mbyte array can only be ordered from the Peripherals and Supplies Group for use as a customer spare. MS780-F memory must be added in pairs for dual memory controllers and interleaved performance. Non-interleaved operation is possible using one controller and can be software enabled.	MS780-FD
10-Mbyte ECC MOS memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with MS780-E memory or MS780-E upgrade. <i>Note:</i> MS780-F memory expansion units cannot be mixed with MS780-B or MS780-D units on the same controller. For existing VAX-11/780 systems with MS780-C controller in the CPU cabinet, the additional MS780-E may be mounted in the CPU Expansion Cabinet (H9652-HB), which increases the system limit to 20 Mbytes (four Mbytes for MS780-C plus 16 Mbytes for MS780-E) for these systems. In this configuration, the 16-Kbyte MS780-C/D memory system will operate in noninterleaved mode while the 64-Kbyte MS780-E/F memory system will be operated in interleaved mode. The MS780-E can also replace the MS780-C memory system in the CPU cabinet for those customers who require in excess of 20 Mbytes of memory or who have space limitations and need to expand their memory configuration within the existing CPU cabinet.	MS780-FF
25-Mbyte ECC MOS Expansion Memory (in 64-Kbyte arrays). <i>Reminder:</i> Memory must be added in 2-Mbyte increments based upon standard interleaving.	MS780-FH
50-Mbyte ECC MOS multiple system memory expansion package (in 64-Kbyte arrays). <i>Reminder:</i> Memory must be added in two-Mbyte increments based upon standard interleaving.	MS780-FJ

**VAX-11/780 (16-K chip) Expansion
Memory Order Codes**

Option	Order Code
1-Mbyte ECC MOS, 16-K chip memory with MS780-C controller. Expandable to a total of four Mbytes with the addition of MS780-Ds. This option can be ordered for expansion beyond four Mbytes of CPU cabinet-mounted memory or to enable interleaving between two memory controllers. Interleaving is programmable and requires equal amounts of memory on each controller. This option can also be used for VAX-11/780 systems that have an MS780-B memory controller to expand beyond 1 Mbyte to a system total of 5 Mbytes.	MS780-CJ
256-Kbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DA
512-Kbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DB
1-Mbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DC
2-Mbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DD
3-Mbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DE
4-Mbyte ECC MOS expansion memory (in 16-K chip arrays).	MS780-DF

**VAX-11/780 (64-K Chip) System
Memory Expansion Order Codes**

Option	Order Code
2-Mbyte ECC MOS, 64-K chip memory with memory backplane, SBI interface, and one interleaved controller (two extended hex-modules). Expandable to a total of 16 Mbytes with the addition of MS780-Fs. This option is for expansion beyond 16 Mbytes of CPU cabinet-mounted memory to a system limit of 32 Mbytes per VAX-11/780. Interleaving is standard and requires equal amounts of memory on each controller module in the backplane (must be added in pairs). Requires two OPS for mounting. Power supply is included.	MS780-ED
4-Mbyte ECC MOS, 64-K chip memory with memory backplane, SBI interface, and one interleaved controller (two extended hex-modules). Expandable to a total of 16 Mbytes with the addition of MS780-Fs. This option is for expansion beyond 16 Mbytes of CPU cabinet-mounted memory up to a system limit of 32 Mbytes per VAX-11/780. Interleaving is standard and requires equal amounts of memory on each controller module in the backplane (must be added in pairs). Requires two OPS for mounting. Power supply is included.	MS780-EB

**VAX-11/780 Memory Option
Order Code**

Option	Order Code
MOS memory battery backup. Powers as much as one Mbyte of MS780-B memory, four Mbytes of MS780-D memory, two Mbytes of MA780 memory or 16 Mbytes of MS780-F memory for at least 10 minutes. <i>Configuring Requirement:</i> In VAX-11/780 systems, mounts in the CPU cabinet, CPU Expansion Cabinet, or the MA780 Multiport Memory cabinet to provide backup power for memory mounted in those cabinets.	H7112-B

MA780 multipoint memory is a bank of ECC MOS memory which can be shared by as many as four VAX-11/780 systems for high-throughput, and high-availability in multi-computer configurations. Each VAX system can randomly access all multipoint memory in exactly the same way that a single CPU system accesses its local memory. Any information stored in the multipoint memory is also immediately accessible to the other VAX-11/780 systems.

There can be two MA780 subsystems connected to each CPU. Each MA780 subsystem can be expanded from a minimum of 256 Kbyte to a maximum of two Mbytes of multipoint memory using MS780-D memory. This is in addition to the 32-Mbyte (64-K chip) maximum of local memory for each VAX-11/780 system. Therefore, a single VAX-11/780 can directly address up to 36 Mbytes of physical memory.

**Multipoint Memory Option
Order Codes**

Option	Order Code
256-Kbyte ECC MOS multipoint memory subsystem, which can be shared by as many as four VAX-11/780 systems. Provides up to 11-Mbyte/s throughput. Includes controller, two MA780-E port interfaces (with cables), cabinet, power supply, plus expansion space for a total of two Mbytes of ECC MOS memory, an MA780-BB subsystem, connection of two additional port interfaces, and the memory battery backup option (H7112).	MA780-JB
Additional MA780 multipoint memory subsystem. Includes controller, 256-Kbyte ECC MOS memory which can be shared by up to four VAX-11/780 systems, two MA780-E port interfaces (with cables), power supply and expansion space for a total of two Mbytes of ECC MOS memory, connection of two additional port interfaces, and the memory battery backup option (H7112).	
<i>Prerequisite:</i> MA780-JB.	MA780-BB
VAX-11/780 Multipoint Memory Selective Cache Invalidate Option. Recommended for three and four processor systems (see note above).	
<i>Prerequisite:</i> MA780-JB or MA780-BB.	MA780-D
MA780 shared memory port interface. One required for third or fourth VAX-11/780 CPU (see note above) connected to either MA780-JA or MA780-BA. Power supply included.	
<i>Prerequisite:</i> MA780-JB or MA780-BB.	MA780-EB
Consists of one H9504-XE filler cab assembly kit and one H9604-AA VAX-11/780 left-hand cab expansion. The MA780-JF is used wherever three or four VAX-11/780 systems are to be connected to the same MA780. These assemblies allow correct cooling and configuring of the VAX-11/780 systems. One MA780-JF must be ordered to upgrade from two to three or from three to four processor configurations. Two MA780-JFs must be ordered to upgrade from two to four processor configurations.	
<i>Configuring Requirements:</i> Each MA780 subsystem is connected to a VAX-11/780 system via the port interface, MA780-E. If one MA780-E is connected to the basic CPU cabinet, no option panel spaces are required. If an MA780-E is connected to the CPU expansion cabinet, H9652-HB, one optional panel space is required. If two MA780-E's are connected to a VAX-11/780 system one option panel space is required.	MA780-JF

VAX-11/750 Processor Option Order Codes

Option	Order Code
<p>The DR750, an intelligent, high-performance, general purpose interface, can be used to connect customer-designed devices to a VAX-11/750, to connect two VAX-11/750 systems together, or to connect a VAX-11/750 to a VAX-11/780 using a DR780. It includes interface logic and 7.6 centimeters (25 feet) of cable. Features of the DR750 include a 3.2-Mbyte/s transfer rate, command and data chaining, dynamic memory mapping, separate data and control paths (synchronous 32-bit parallel data transfer path and asynchronous 8-bit control path). Also included is a library of high-level language support routines and complete I/O driver logic. Symmetric point-to-point interconnect capability allows two VAX-11/750 systems to be connected through the DR750.</p> <p><i>Configuring Requirements:</i> The DR750 requires one general purpose I/O slot and one panel insert in the CPU CAB. There is a limit of one DR750 per VAX-11/750 system. The DR750 cannot be used on the same system with the CI750 computer interconnect. The cable from the user device to the DR750 can be as long as 24.2 meters (80 feet).</p>	DR750-F
<p>VAX-11/750 Second UNIBUS Adapter (one per system).</p> <p><i>Prerequisites:</i> H9642-F, BA11-KV, and DD11-DK.</p>	DW750
<p>High-performance, floating-point accelerator for single- and double-precision F₊ and D₊ floating-point instructions plus POLY, EMOD, and MULL.</p>	FP750
<p>1-Kbyte words (88-bit words) user writable control store plus Extended G₊ and H₊ floating-point data type supported in KU750-loadable microcode. Includes single-use license, source license, binaries, and support kit for loader. The microcode development tools (i.e., the assembler or debugger) are not available for this option.</p>	KU750-YG
<p>The CI750 (computer interconnect) is a microprocessor-controlled, fully buffered high speed interface between the Memory Interconnect of the CPU and the dual path CI bus. The CI750 is mounted in a 101.6-centimeter (40.6-inch) high freestanding cabinet. The unit consists of three extended-length, hex-height modules, an associated backplane, and a power supply contained within a 26.6-centimeter (10.5-inch) high mounting enclosure. A CI750 interface module which installs in an available I/O slot of the CPU backplane, is also included with the option. The interface module connects to the CI adapter through a set of flat cables, also included. The CI750 adapter operates together with the SC008 star coupler option to form the CI bus. Signals between the adapter and star coupler units are transferred through coaxial cables with a maximum length of 45 meters (145 feet).</p> <p><i>Prerequisites:</i> VAX/VMS V 3.5 or higher, PCS microcode Rev 97 (minimum), local VMS disk (until VAX/VMS V 4.0), and the VAX-11/750 CPU must be Rev 5. Further requirements of the CPU configuration are as follows; if a UDA50 is present, the CPU must be Rev 7 and the UDA50 must have Rev 5 microcode, if a DW750 and a UDA50 are present, the DW750 must be Rev 2.</p>	CI750-BD
<p>Same as the CI750-BB but without the 101.6-centimeter (40.6-inch) high free standing cabinet.</p>	CI750-AB

Option	Order Code
The star coupler is the option to which all VAX-11/750, and VAX-11/780 systems on the same computer interconnect are connected. The SC008 is a passive hub device providing a dual CI path and electrical isolation between CPU nodes. The SC008-AC supports up to 8 dual-path CPU or HSC50 nodes; the -AD is the upgrade to support 9-16 nodes.	SC008-AC
Upgrade to star coupler. For nine to 16 nodes	SC008-AD
CI cable set – 10 meters (32 feet)	BNCIA-10
CI cable set – 20 meters (65 feet)	BNCIA-20
CI cable set – 45 meters (145 feet)	BNCIA-45

VAX-11/750 Memories

Note: There is adequate power and prewired mounting space in the CPU backplane to add the following memory to VAX-11/750 systems, up to a total of eight Mbytes per system.

VAX-11/750 Expansion Memory Order Codes

Option	Order Code
1-Mbyte ECC MOS expansion memory (in one 64-K chip array). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CA
2-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CB
3-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CC
4-Mbyte ECC MOS expansion memory (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CD
10-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CF
25-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CH
50-Mbyte ECC MOS Multiple System Memory Expansion Package (in 64-K chip arrays). <i>Prerequisite:</i> CPU with 64-Kbyte memory controller or MS750-D upgrade.	MS750-CJ
Memory controller plus 1-Mbyte ECC MOS expansion memory (64-K chip arrays) to replace 16-Kbyte controller. <i>Prerequisite:</i> VAX-11/750-BA CPU – serial #BT03096 or greater.	MS750-DA
Memory controller and backplane, plus 1-Mbyte ECC MOS expansion memory (64-K chip arrays) to replace 16-Kbyte controller. <i>Prerequisite:</i> VAX-11/750-BA CPU – serial number lower than BT03096.	MS750-DC

VAX-11/750 Memory Option Order Codes	<table> <tr> <th>Option</th><th>Order Code</th></tr> <tr> <td>MOS memory battery backup. Powers up to full capacity of CPU memory for at least 10 minutes. <i>Configuring Requirement:</i> Mounts in dedicated location in the CPU cabinet to provide backup power for memory mounted in the CPU Backplane.</td><td>H7112-B</td></tr> </table>	Option	Order Code	MOS memory battery backup. Powers up to full capacity of CPU memory for at least 10 minutes. <i>Configuring Requirement:</i> Mounts in dedicated location in the CPU cabinet to provide backup power for memory mounted in the CPU Backplane.	H7112-B														
Option	Order Code																		
MOS memory battery backup. Powers up to full capacity of CPU memory for at least 10 minutes. <i>Configuring Requirement:</i> Mounts in dedicated location in the CPU cabinet to provide backup power for memory mounted in the CPU Backplane.	H7112-B																		
VAX-11/730 and 725 Processor Option Order Codes	<table> <tr> <th>Option</th><th>Order Code</th></tr> <tr> <td>High-performance, floating-point accelerator for single- and double-precision and G₊ and H₊ floating-point instructions plus POLY, EMOD, and MULL.</td><td>FP730</td></tr> </table>	Option	Order Code	High-performance, floating-point accelerator for single- and double-precision and G ₊ and H ₊ floating-point instructions plus POLY, EMOD, and MULL.	FP730														
Option	Order Code																		
High-performance, floating-point accelerator for single- and double-precision and G ₊ and H ₊ floating-point instructions plus POLY, EMOD, and MULL.	FP730																		
VAX-11/730 Expansion Memory Order Codes	<table> <tr> <th>Option</th><th>Order Code</th></tr> <tr> <td colspan="2"><i>Note:</i> There is adequate power and prewired mounting space in the CPU backplane to add the following memory to VAX-11/730 systems: as many as five Mbytes per <i>packaged system</i>, but only three Mbytes for system building blocks.</td></tr> <tr> <td>1-Mbyte ECC MOS expansion memory (one 64-K chip array).</td><td>MS730-CA</td></tr> <tr> <td>2-Mbyte ECC MOS expansion memory (in 64-K chip arrays).</td><td>MS730-CB</td></tr> <tr> <td>3-Mbyte ECC MOS expansion memory (in 64-K chip arrays).</td><td>MS730-CC</td></tr> <tr> <td>4-Mbyte ECC MOS expansion memory (in 64-K chip arrays).</td><td>MS730-CD</td></tr> <tr> <td>10-Mbyte ECC MOS multiple system memory expansion Package (in 64-K chip arrays).</td><td>MS730-CF</td></tr> <tr> <td>25-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).</td><td>MS730-CH</td></tr> <tr> <td>50-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).</td><td>MS730-CJ</td></tr> </table>	Option	Order Code	<i>Note:</i> There is adequate power and prewired mounting space in the CPU backplane to add the following memory to VAX-11/730 systems: as many as five Mbytes per <i>packaged system</i> , but only three Mbytes for system building blocks.		1-Mbyte ECC MOS expansion memory (one 64-K chip array).	MS730-CA	2-Mbyte ECC MOS expansion memory (in 64-K chip arrays).	MS730-CB	3-Mbyte ECC MOS expansion memory (in 64-K chip arrays).	MS730-CC	4-Mbyte ECC MOS expansion memory (in 64-K chip arrays).	MS730-CD	10-Mbyte ECC MOS multiple system memory expansion Package (in 64-K chip arrays).	MS730-CF	25-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).	MS730-CH	50-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).	MS730-CJ
Option	Order Code																		
<i>Note:</i> There is adequate power and prewired mounting space in the CPU backplane to add the following memory to VAX-11/730 systems: as many as five Mbytes per <i>packaged system</i> , but only three Mbytes for system building blocks.																			
1-Mbyte ECC MOS expansion memory (one 64-K chip array).	MS730-CA																		
2-Mbyte ECC MOS expansion memory (in 64-K chip arrays).	MS730-CB																		
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4-Mbyte ECC MOS expansion memory (in 64-K chip arrays).	MS730-CD																		
10-Mbyte ECC MOS multiple system memory expansion Package (in 64-K chip arrays).	MS730-CF																		
25-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).	MS730-CH																		
50-Mbyte ECC MOS multiple system memory expansion package (in 64-K chip arrays).	MS730-CJ																		
VAX-11/725 Expansion Memory Order Code	<table> <tr> <th>Option</th><th>Order Code</th></tr> <tr> <td>1-Mbyte ECC MOS expansion memory (one 64-K chip array).</td><td>MS730-CA</td></tr> </table>	Option	Order Code	1-Mbyte ECC MOS expansion memory (one 64-K chip array).	MS730-CA														
Option	Order Code																		
1-Mbyte ECC MOS expansion memory (one 64-K chip array).	MS730-CA																		

CPU Cabinets

Two CPU cabinets are available for integrating the PDP-11/24 and PDP-11/44 CPU boxes with Digital mass storage devices or non-Digital mounting boxes. These cabinets feature a centered, shielded enclosure and shielded cable duct that is routed to an I/O Connection Panel. When mounted in this shield and used with appropriate interfaces and I/O Connection Panel inserts, the PDP-11/24 and PDP-11/44 comply with FCC RF emission regulations as Class A systems. The top and bottom mounting spaces are not shielded, and only Class A compliant equipment should be mounted in them. Digital disk subsystems are RF shielded at the box level, and may be mounted in these spaces.

Note: Because of its depth, the RA60 disk subsystem cannot be mounted in this cabinet. It requires its own deep H9642-AR cabinet. BA11 expander boxes cannot be mounted in the CPU cabinet. The I/O is routed to the Connection Panel which provides 12 panel units of mounting space.

Power controllers capable of furnishing 24 amps of 120 Vac or 12 amps of 240 Vac are supplied with the CPU cabinets.

UNIBUS CPU Cabinet Order Codes

Option	Order Code
CPU cabinet includes mounting space for a 26.6-centimeter (10.5-inch) or 13.3-centimeter (5.25-inch) CPU, one additional 26.6-centimeter (10.5-inch) or 13.3-centimeter (5.25-inch) device, and a battery backup unit. The I/O Connection Panel is included. This cabinet is included with kernels and standard building block systems and can accommodate <i>one</i> TU58-DA, RL211-AK, RUA80-AD, RUA81-AD, or RX211-BN.	H9642-EB
Wide CPU cabinet provides mounting space for a 26.6 cm (10.5 in) CPU and two additional 26.6 cm (10.5 in) or 13.3 cm (5.25 in) devices. Side mounting space is provided for the battery backup unit. The I/O Connection Panel is included. This cabinet is included with widebody building block systems and can accommodate any combination of <i>two</i> TU58s, RL02s, RX02s, RA80s or RA81s, but <i>not</i> two RA80/RA81s.	H9645-EB

Site Preparation Specifications

H9642-EB

- Height: 106 cm (41.7 in)
- Width: 53.9 cm (21.2 in)
- Depth: 80 cm (31.5 in)
- Weight: 91.7 kg (202 lb) as configured
- Receptacles: NEMA #6-15R 240 Vac/50 Hz

H9645-EB

- Height: 106 cm (41.7 in)
- Width: 73.6 cm (29 in)
- Depth: 80 cm (31.5 in)
- Weight: 117 kg (258 lb) as configured
- Receptacles: NEMA #6-15R 240 Vac/50 Hz

Partitioned Cabinets

Expander cabinets are bolted to the right end of H9642 or H9645 CPU cabinets; they do not have side panels. The existing right side panel of the CPU cabinet is then used as the right side panel of the expander cabinet. A UNIBUS cable passes through a shielded port between the cabinets. I/O Connection Panel inserts for all options must be located in the same cabinet which contains the associated device controller interface. Expander cabinets are supplied with power controllers capable of furnishing 24 amps of 120 Vac or 12 amps of 240 Vac.

**UNIBUS Partitioned Cabinet
Order Codes**

Option	Order Code
Partitioned expander cabinet provides mounting space for a BA11-KV UNIBUS expander box and one 26.6-centimeter (10.5-inch) disk or tape. The expander box mounts in the RFI shielded central position, and together with a shielded cable duct and an I/O Connection Panel (13 panel units of space) provides an expansion enclosure for Digital options. The top 26.6 centimeters (10.5 inches) of mounting space is unshielded and can be used to mount any of the Digital disk subsystems listed for the UNIBUS CPU cabinets.	H9642-FB

Site Preparation Specifications*H9642-FB*

- Height: 106 cm (41.8 in)
- Width: 53 cm (21 in)
- Depth: 80 cm (31.5 in)
- Weight: 91.7 kg (202 lb) as configured
- Receptacles: NEMA #6-15R 240 Vac/50 Hz

**UNIBUS Unpartitioned Cabinet
Order Codes**

Option	Order Code
Unpartitioned expander cabinet provides mounting space for a BA11-KV UNIBUS expander box and two I/O Connection Panels, for a total of 29 panel units of I/O connection space. No disk/tape options can be mounted in this cabinet.	H9642-FD

Site Preparation Specifications*H9642-FD*

- Height: 106 cm (41.8 in)
- Width: 53 cm (21 in)
- Depth: 80 cm (31.5 in)
- Weight:
- Receptacles: NEMA #6-15R 240 Vac/50 Hz



General Purpose System Cabinet

The H9647 is a 153.6-centimeter (60.5-inch) high general purpose system cabinet. It has been expressly designed for OEM system applications that require a flexible, economical, high-density EMI/RFI shielded packaging alternative. The H9647 provides enough internal mounting space to accommodate four 26.6-centimeter (10.5-inch) devices or an assortment of different sized devices.

The five-and-one-half sided shielded cabinet shown above is the base cabinet configuration. For configuration flexibility the sixth (front) side is open. The base cabinet is complemented by an assortment of options including additional I/O connection panels (IOCP), shielding partitions, front and rear doors, front covers, power controllers, joiner panel and end panel assemblies.

General Purpose System Cabinet Order Codes

Option	Order Code
General Purpose System Cabinet that provides 131.3 centimeters (52.5 inches) of internal mounting space. It includes a vertical I/O connection panel (H9544-SR) that provides 20 panel units of mounting space and space for mounting the 877 power controller. I/O panel space can be expanded with the addition of horizontal IOCP options (see bulkhead assemblies).	H9647-AA
Power Controllers	
The H9647 System Cabinet uses the 877 powercontroller. The power controller mounts into the bottom of the H9544-SR I/O bulkhead assembly.	
Single-phase, filtered 240 Vac, 12 Amp, 6 outlets	877-B
End Panels and Joiner Panels	
Side panels for use with the H9647 System Cabinet. These panels have light gray roll form edges, with contrasting charcoal brown inserts.	
<i>Note:</i> Two H9544-AC end panels are included with the H9647-AA.	H9544-AC
Joiner panel assembly for connection of two H9647 System Cabinets	H9544-JF
Shielding Partitions	
Four shielding partitions have been designed for use with the H9647 System Cabinet. These options allow device level compliant options to be segregated from devices requiring shielding.	
Partitions the upper 26.6 centimeters (10.5 inches) of space in the full bay portion of the cabinet.	H9544-SV
Partitions the upper 33.2 centimeters (21 inches) of space in the full bay portion of the cabinet.	H9544-SU
Partitions the bottom 26.6 centimeters (10.5 inches) of space in the full bay portion of the cabinet.	H9544-SX
Partitions the bottom 33.2 centimeters (21 inches) of space in the full bay portion of the cabinet.	H9544-SZ

Option	Order Code
Front Doors, Inserts, and Covers	
Shielded 13.3-centimeter (5.25-inch) front cover.	H9544-DD
Shielded 26.6-centimeter (10.5-inch) front cover.	H9544-DE
Shielded 8.8-centimeter (3.5-inch) front cover.	H9544-DH
Non-shielded 6.3-centimeter (2.5-inch) bottom cover. Used with H9544-SX, -SZ partition inserts for covering the base assembly of the cabinet. Not for use with the H9544-E doors.	H9544-DC
Double sided 4.4-centimeter (1.75-inch) shielding insert used between devices or covers.	H9544-SP
Shielded front door that covers the cabinet base plus 31.1 centimeters (12.25 inches) of vertical mounting space.	H9544-EM
Shielded full height louvered front door assembly.	H9544-EP
Bulkhead Assemblies	
Primary bulkhead assembly providing eight additional I/O connection panel units. Mounts horizontally in the bottom rear of the H9647 system cabinet.	H9544-SA
Secondary bulkhead assembly providing eight additional I/O connection panel units. Mounts horizontally above the H9544-SA assembly.	H9544-SA
<i>Note:</i> The addition of bulkhead assemblies in the full bay portion of the cabinet prevents front-to-rear cooling. For this reason, equipment should not be mounted in this space.	
Rear Doors	
A shielded, fully enclosed rear door for the full bay section of the cabinet. For applications that do not require more I/O connection panel space than is provided with the base cabinet.	
<i>Note:</i> the H9544-BN rear door is included with the H9647-AA System Cabinet.	H9544-BN
A rear door for the full bay section of the cabinet. For applications that require more I/O connection panel space than is provided with the base cabinet. (See additional bulkhead assemblies.) The bottom of the H9544-BS rear door is cut away to allow room for cabling	H9544-BS

Site Preparation Specifications

(Outside dimensions)

- Height: 153.6 cm (60.5 in)
- Width: 73.6 cm (29.0 in)
- Depth: 80 cm (31.5 in)

(Internal dimensions)

- Height: 131.3 cm (52.5 in)
- Width (total): 67.3 cm (26.5 in)(19-inch EIA rackmount space plus 7.5-inch cable mounting)
- Depth: 67.9 cm (26.75 in)

Note: For additional ordering and configuring information contact your Peripherals and Supplies Group Sales Representative.

Mass Storage Cabinets

Mass storage cabinets handle Digital disk products and are offered in two variations depending on the size and type of disks needed. These cabinets are not suitable for mounting processors or BA11 expander boxes because they are not shielded.

Mass Storage Cabinet Order Codes

Option	Order Code
Top-loading cabinet for the RA60 removable disk. Allows mounting of any combination of three RA60s, RA80s, and RA81s in the middle and bottom cabinet bays. The first RA60, however, must be mounted in the top bay.	H9642-AR
Top-loading expansion cabinet for the RL02. Provides 53.3 centimeters (21 inches) of mounting space beneath the RL02.	H9642-BE

Site Preparation Specifications*H9642-AR*

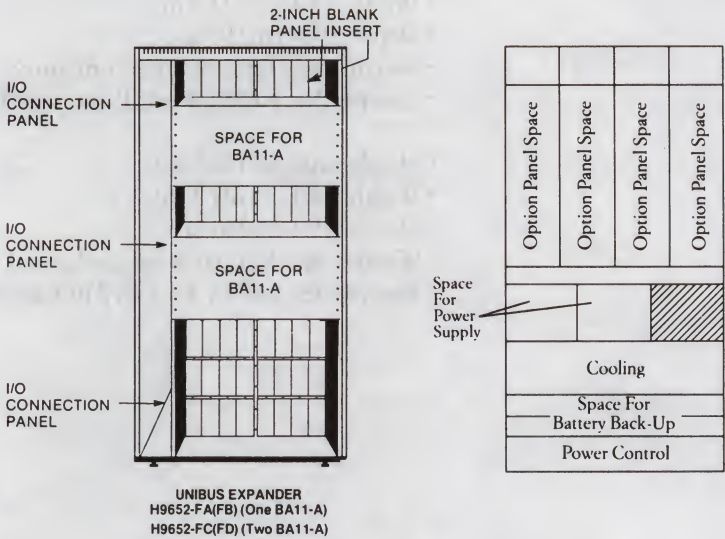
- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 91.4 cm (30 in)
- Weight: 90.7 kg (200 lb) as configured
- Receptacles: NEMA #6-15R 240 Vac/50 Hz

H9642-BE

- Height: 106 cm (41.7 in)
- Width: 54.1 cm (21.3 in)
- Depth: 91.4 cm (30 in)
- Weight: 90.7 kg (200 lb) as configured
- Receptacles: NEMA #6-15R 240 Vac/50 Hz

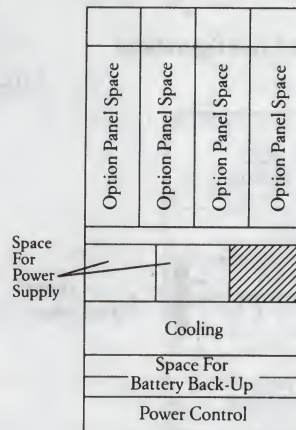
VAX 8600 Expansion Cabinet
Order Codes

Option	Order Code
VAX 8600 UNIBUS expansion cabinet which includes one BA11-A box and forty panel units comprised of ten groups of four panel units. Can be expanded with a second BA11-A. Requires DD11-DK/CK backplanes.	H9652-FB
VAX 8600 UNIBUS expansion cabinet which includes two BA11-A boxes and forty panel units comprised of ten groups of four panel units. Requires DD11-DK/CK backplanes.	H9652-FD
VAX 8600 UNIBUS expansion cabinet (customer configurable, no factory integrated options allowed)	H9652-FF
VAX 8600 SBI expansion cabinet. Consists of SBI backplane plus power supply. Provides four option panel spaces (OPS). There are two locations for mounting power supplies. OPS slots one and two share one power supply while OPS slots three and four share the other.	H9652-CB



VAX 11/785 and 780 CPU Cabinet Order Codes

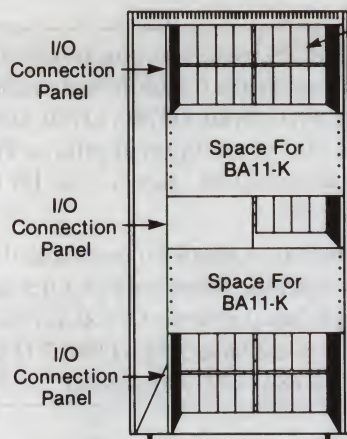
Option	Order Code
Consists of SBI backplane plus power supply. Provides four option panel spaces for additional memory, (MS780-C/D or MS780-E/F), DW780, DR780, CI780, MBAs (MASSBUS Adapters), and MA780 multiport interfaces. The CPU Expansion Cabinet also includes space for one H7112-B memory battery backup option.	
There are two locations for mounting the power supplies included with the above options. OPS slots one and two share one supply location while OPS slots three and four share the other. There is a limit of two H9652-H cabinets per each 11/785, 11/782 or 11/780 systems.	
	H9652-HB



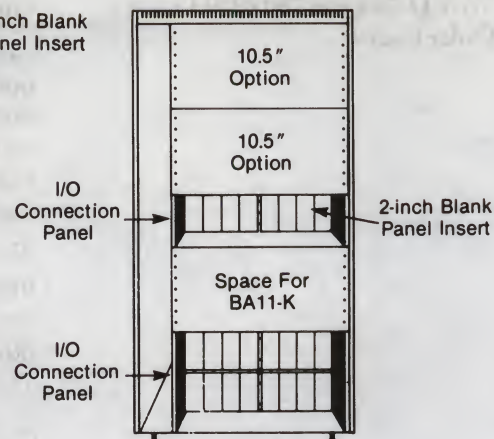
VAX 11/785 and 780 UNIBUS Cabinet Order Codes

Option	Order Code
Provides space for two BA11-K boxes. The cabinet also can be configured with one BA11-K box and up to two 26.6-centimeter (10.5-inch) rackmount options (for example RL02s). The available <i>panel units</i> vary depending on the cabinet configuration. The two-box configuration contains 40 <i>panel units</i> comprised of ten groups of four <i>panel units</i> . Due to cable space limitations only 32 of these <i>panel units</i> can be used for multiplexed communications options (for example DHU11, DZ11, DMF32). The remaining eight <i>panel units</i> are available for other UNIBUS options (for example UDA50, DMR11, DUP11). The I/O connector panel space drops to 32 <i>panel units</i> in the one BA11-K/one 26.6-centimeter (10.5-inch) rackmount option and 24 in the one BA11-K/two 26.6-centimeter (10.5-inch) rackmount option configuration. On the 32 and 24 <i>panel unit</i> configurations there are no restrictions to <i>panel unit</i> usage.	
Notes: (1) The standard cabinet is configured to support two BA11-Ks with all panel units filled with 5.2-centimeter (2-inch) blank insert panels. The configurations with 26.6-centimeter (10.5-inch) rackmounted options require no additional cabinet hardware, only reconfiguration/removal of existing cabinet hardware. (2) Due to AC power limitations, configurations containing two BA11-Ks and one 26.6-centimeter (10.5-inch) option are prohibited.	
	H9652-MH

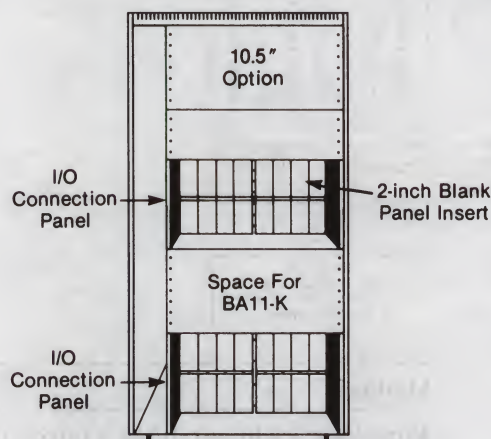
**VAX/11-780 and VAX-11/785
UNIBUS EXPANSION CABINET
H9652-MF (MH)**



(Rear View, Standard Configuration)



**Rear View
(One BA11K and two 10.5" Options)**



**Rear View
(One BA11K and one 10.5" Option)**

**VAX 11/750 and 730* UNIBUS
Expansion Cabinets**

UNIBUS expansion cabinets measure 106 centimeters high by 53 centimeters wide by 80 centimeters deep (41.8 inches by 21.0 inches by 31.5 inches).

The module(s) of a UNIBUS controller/interface mount in the DD11-CK,-DK UNIBUS backplanes which are mounted in a BA11-K box. The I/O Connector Panel inserts included with a UNIBUS option mount in the rear I/O Connector Panel mounting frames in the space(s) filled with blank insert panels.

*VAX-11/730 Prerequisite: A shielded UNIBUS cable kit (CK-BC11Y-06 is required for SV-CXMM VAX-11/730 packaged system).

UNIBUS Expansion Cabinet Order Codes

Option

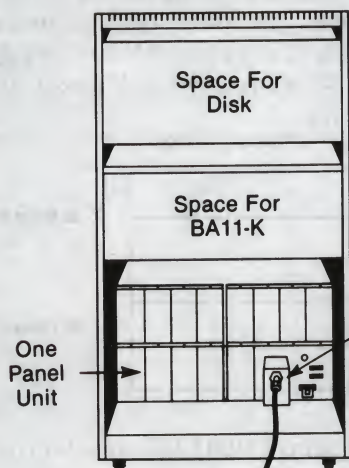
Order Code

UNIBUS Expansion Cabinet with space for one BA11-K expander box and one 26.6 centimeter (10.5-inch) disk, front loading option. The cabinet is partitioned into two sections. The top 26.6 centimeters (10.5 inches) of mounting space supports an RL02, RA80, or RA81 disk. The remaining space supports a BA11-K expander box (ordered separately). The cabinet provides I/O connection panel space to mount three groups of four panel units each and one additional panel unit.

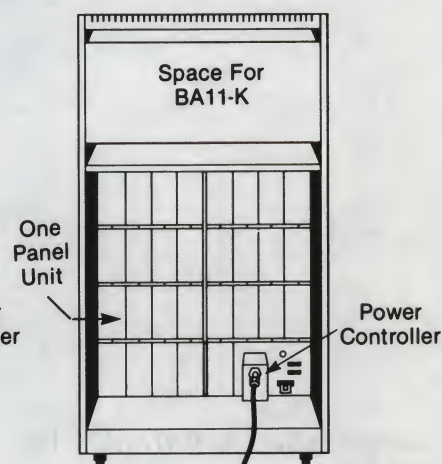
H9642-FB

This cabinet is fully shielded and contains a controller, an I/O connector panel, and space for a BA11-K expander box. The I/O connector panel has space to mount seven groups of four panel units each and one additional panel unit.

H9642-FD



**UNIBUS Expansion Cabinet
H9642-FB
(Rear View)**



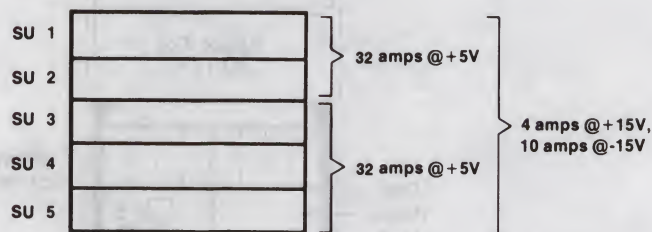
**UNIBUS Expansion Cabinet
H9642-FD
(Rear View)**

VAX 11/730 Shielded UNIBUS Cable Kit Order Codes

Option	Order Code
VAX-11/730 Shielded UNIBUS Cable Kit containing a BC11Y-06 with two M9014 interface cards, two I/O connection panels, three BC05L-07 and three BC05L-08 cables.	
<i>Note:</i> Required with VAX-11/730 Packaged System (SV-CXWEA, SV-CXMMA, or SV-CXWMA) and must be ordered separately.	
	CK-BC11Y-06

Mounting Box Order Codes

Option	Order Code
Rackmountable expansion box with slides for the VAX UNIBUS Expansion Cabinet. Provides mounting space for five system units and is compatible with DD11-CK/DK expansion backplanes. The power supply is rated at 64 amps @ +5 V total, with 32 amps @ +5 V for SUs 1-2, and 32 amps @ +5 V for SUs 3-5, 4 amps @ +15 V for SUs 1-5, and 10 amps @ -15 V for SUs 1-5.	
	BA11-KV



Configuring Rules for BA11-AM VAX 8600 Expansion Boxes

When adding a DD11-DK expansion backplane to a BA11-AM expansion box the following rules apply:

1. In addition to the regular configuring rules on the current (amps) available for the backplane, the BA11-AM expansion box requires that power (watts) drawn by options be known and used as a configuring requirement. The total power (watts) drawn by UNIBUS options mounted in the expansion box cannot exceed 500 watts (see discussion below).
2. Configure hex-sized options in the backplane starting in slot three. Slots one, two and nine are available only for use by quad-size options, unless configuring quad-size options in these slots violates rule #3.
3. Any single module option that draws more than 40 watts requires that the slot to the component side of the option be unoccupied, due to cooling restrictions. Options comprised of two modules (i.e. DEUNA) that draw over 40 watts can be mounted in consecutive slots, and require that slot to the component side of the two module option to be unoccupied.

Power (watts) To compute the watts of UNIBUS options use the following formula.

Formula: Voltage \times current (amps) = Power (watts)

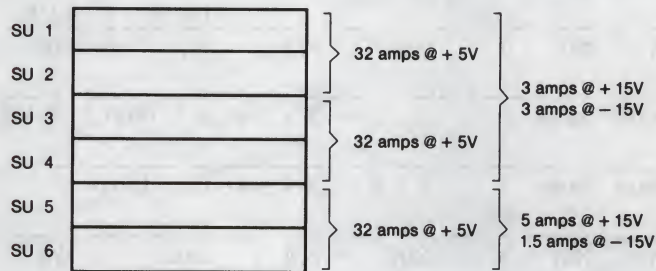
Example: The DMF32 Communications Controller draws 8 amps @ +5 V, .50 amps @ +15 V, and .50 amps @ -15 V. Using these figures as input to the formula the following results are achieved:

$$\begin{aligned}
 8 \times 5 &= 40 \text{ (watts)} \\
 .5 \times 15 &= 7.5 \text{ (watts)} \\
 .5 \times 15 &= 7.5 \text{ (watts)}
 \end{aligned}$$

Option total = 55 watts

This result is important in two ways. One, because the DMF32 option draws more than 40 watts, the slot to the component side of the option needs to be unoccupied. Second, the watts drawn by the DMF32 (55) is subtracted from the available total of 500.

Therefore, to add the DMF32 to an unpopulated DD11-DK backplane in a BA11-AM expansion box, the option will require two slots (slot number two for the 40 watt rule, slot number three for the module) and leaves 445 watts remaining. Adding a second DMF32 to the backplane would require two slots, slot number four remains unoccupied and the second DMF32 module is configured in slot number five. Proceed in the same manner for additional UNIBUS options, tracking the total watts for the box, and insuring the adherence to the slot rule based on the option's power (watt) requirements.



	A	B	C	D	E	F
* 1	UNIBUS		QUAD SLOT			
* 2			QUAD SLOT			
3			HEX SLOT			
4			HEX SLOT			
5			HEX SLOT			
6			HEX SLOT			
7			HEX SLOT			
8			HEX SLOT			
* 9	UNIBUS		QUAD SLOT			

* See configuring rule #2

Expansion Backplane Order Codes

Option

Order Code

Expansion backplane mounting unit for BA11-K box. Provides space for two hex-slot and two quad-slot modules. Mounts in one system unit.

DD11-CK

Dual expansion backplane mounting unit for BA11-K box. Provides space for seven hex-slot and two quad-slot modules. Mounts in two system units.

DD11-DK

DD11-DK BACKPLANE

	A	B	C	D	E	F
1	UNIBUS		QUAD SLOT			
2			HEX OR QUAD SLOT			
3			HEX OR QUAD SLOT			
4			HEX OR QUAD SLOT			
5			HEX OR QUAD SLOT			
6			HEX OR QUAD SLOT			
7			HEX OR QUAD SLOT			
8			HEX OR QUAD SLOT			
9	UNIBUS		QUAD SLOT			

DD11-CK BACKPLANE

	A	B	C	D	E	F
1	UNIBUS		QUAD SLOT			
2			HEX OR QUAD SLOT			
3			HEX OR QUAD SLOT			
4	UNIBUS		QUAD SLOT			

UNIBUS Repeater Order Codes

Option

Order Code

Adds 19 unit bus loads and allows up to 15.2 meters (50 feet) of additional UNIBUS length to be added to the system.

DB11-MP

**Memory & CPU Options
(Cabinet Level)
Site Preparation**

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
CI750-BD	4	240	50-60	1	2.0	364	1242	L5-30R	41.7	20.3	30.0	235.0 ¹
							[1310]	6-15R	[106.0]	[51.4]	[76.2]	[106.7] ¹
CI750-FB	4	240	50-60	1	4.0 ³	728	2484	65-30R ³	41.7	20.3	30.0	
							[2610]	6-15R ³	[106.0]	[51.4]	[76.2]	
CI750-HB	4	240	50-60	1	4.0 ³	728	2484	65-30R ³	41.7	20.3	30.0	
							[2610]	6-15R ³	[106.0]	[51.4]	[76.2]	
H9554-XE		N/A	N/A	0	N/A	N/A	N/A	N/A	60.3	30.0	30.0	200.0 ¹
									[153.0]	[76.2]	[76.2]	[90.8] ¹
MA780-JB		240/416	50-60	3	X + 2.8 ³	X + 540 ³	X + 1842 ³	L21-30R	60.3	26.3	30.0	700.0 ¹
									[153.0]	[66.7]	[76.2]	[318.0] ¹
MA780-KB		240/416	50-60	3	X + 4.7 ³	X + 902 ³	[X + 3247] ^{3 2}		60.3	26.3	30.0	700.0 ¹
									[153.0]	[66.7]	[76.2]	[318.0] ¹
SC008-AC		N/A	N/A	0	N/A	N/A	N/A	N/A	41.7	21.0	30.0	150.0 ¹
									[106.0]	[53.3]	[76.2]	[68.1] ¹

NOTES = MEMORY AND CPU OPTIONS (CABINET LEVEL)

¹ All weights are given for a fully configured product.

² No NEMA type receptacle available for 240/416V variations.

³ X = Requirements (cooling, power) of internally mounted options.

⁴ For power and cooling requirements of CI750 interface Module, see Site Preparation Data for Non-Cabinet Level Options.

⁵ The power requirements given above are divided equally between two separate power controllers in the CI750-xx cabinet. Each of the power controllers has a cord/plug for external power.

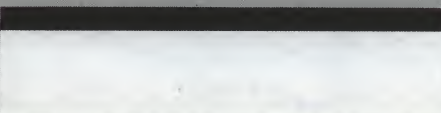
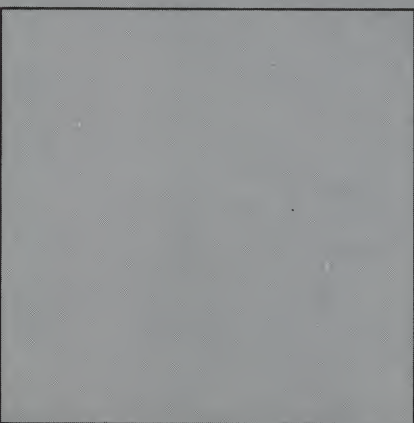
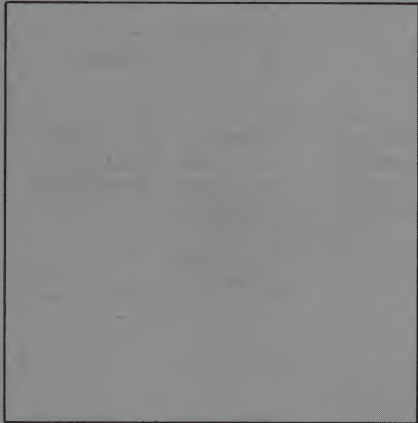
10000

5000

1000

1000

1000



Asynchronous Devices

	DLV11	DZV11	DHV11	KMV11	DL11	DZ11	DHU11	KCT32	DZQ11
BUS	Q-BUS	Q-BUS	Q-BUS	Q-BUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	Q-BUS
Number of Lines	DLVE1/DLVJ1 4 1/4		8	1	1	8	16	2	4
DMA¹	No	No	Yes	Yes	No	No	Yes	Yes	No
Maximum Speed	19.2 Kbits per second	9.6 Kbits per second	38.4 Kbits per second	64 Kbits per second	9.6 Kbits per second	9.6 Kbits per second	38.4 Kbits per second	130 Kbits per second	4.6 Kbits per second
Multi CPU Access²	No	No	No	No	No	No	No	No	No
Modem Control³	Limited (Depends on the version)	Limited	Full	Full	Full	Limited (Depends on the version)	Full	Full	Limited
Primary Buying Reason	Lowest Price	Modem Control	DMA Performance on PDP-11s	For custom applications user program-mable, High performance with bit stuff protocols	Lowest Price	Lowest Price per line	DMA performance with full modem control	For custom applications user program-mable (sync or async) interface on VAX systems	Dual height module with modem control

	DZ32	DH11	DMF32	DMZ32	DZS11	DN25	DC20	DECSA
BUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	ETHERNET
Number of Lines	8	16	8	24	8	8	16	1-32
DMA¹	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Maximum Speed	9.6 Kbits per second	9.6 Kbits per second	19.2 Kbits per second	19.2 Kbits per second	9.6 Kbits per second	9.6 Kbits per second	9.6 Kbits per second	19.8 Kbits per second
Multi CPU Access²	No	No	No	No	No	No	No	Yes
Modem Control³	Full	Full	Full (2 lines) None (6 lines)	Full	N/A	Limited (Depends on the version)	Full	Yes
Primary Buying Reason	Full modem control Split-speed	DMA Performance on PDP-11s	DMA Performance 1 synchronous line 1 lineprinter port	Terminal distribution panel may be placed 5000' from host	Connects B terminals to a host across one 19.2 Kbits/sec synchronous line	Interface to DECsystem-10s and DECsystem-20s	Interface to DECsystem-10s and DECsystem-20s	Ethernet terminal server

¹ DMA (Direct Memory Access) is the ability to move multi-character messages between a communication line and CPU memory without interrupting the CPU. This capability yields higher performance.

² Multi-CPU Access refers to the ability to send a message directly to two or more CPU's without routing the message through another CPU.

³ Modem Control refers to the number of signals available to control modem functionality on U.S. and European modems. Full modem control includes nine to eleven signals. Limited modem control means only send and receive signals are present for each line.

Synchronous Devices

	DECNA	DEQNA	DPV11	DMV11	DEUNA	DV11	DMP11	KCT32
BUS	PC300-BUS	Q-BUS	Q-BUS	Q-BUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS
Number of Lines	1	1	1	1	1	8/16	1	2
DMA¹	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Maximum Speed	10 Mbits per second	10 Mbits per second	56 Kbits per second	56 or 19.2 Kbits per second (Depends on the version)	10 Mbits per second	9.6 Kbits per second	1 Mbit per second	2 lines @ 64 Kbits per second 1 line @ 130 Kbits per second
Software Support	PRO/DECnet	DECnet RSX DECnet-Micro/ RSX, MicroVMS	DECnet-RT DECnet-RSX RSX PSI* DECnet-Micro/ RSX VAX PSI*	DECnet/RT DECnet-RSX DECnet/E MicroVMS	DECnet-VAX DECnet-RSX	None	DECnet-RT DECnet-VAX DECnet-RSX DECnet-E	None
Multi CPU Access²	Yes	Yes	No	Yes	Yes	No	Yes	No
Modem Control³	N/A	N/A	Full	Full	N/A	Full	Full	Full
Primary Buying Reason	Access to Ethernet	Access to Ethernet	Low Cost	High Performance DDCMP multi-point configurations	Access to Ethernet	Support of multiple synchronous lines, usually to IBM terminals	Multi-point configuration	For custom applications user programmable (sync or async) interface on VAX systems

	KMV11	DMR11	PCL11	KMS11-BD	COMM IOP-DUP	DUP11	KMS11-P	DN20	DECSA
BUS	Q-BUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	UNIBUS	Ethernet
Number of Lines	1	1	Parallel Bus	8	1-16	1	1	8	1-8
DMA¹	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Maximum Speed	64 Kbits per second	1 Mbyte per second	1 Mbyte per second	8 lines up to 56 Kbits per second ⁵	19.2 Kbits per second	9.6 Kbits per second	64 Kbits per second	19.2 Kbits per second	500 Kbits per second
Software Support	RSX-11M HDLC framing	DECnet RT DECnet-20 DECnet-10 DECnet/E DECnet-VAX DECnet-RSX	DECnet-RSX DECnet-VAX	RSX-PSI VAX-PSI ⁴	RSX-11M SNA PE	IBM Internets ⁶ RSX-PSI VAX-PSI DECnet-RT DECnet-RSX	VAX-PSI ⁴	DECnet-20 DECnet-10* TOPS-20 PSI	
Multi CPU Access²	Yes	No	Yes	No	No	No	No	Yes	Yes
Modem Control³	Full	Full	N/A	Full	Full	Full	Full	Full	Yes
Primary Buying Reason	High performance for bit stuff protocols User programmable	DECnet-interface across phone lines	High performance local inter-CPU bus	Multiple line X.25 support high performance	High performance for bit stuff protocols	Low Cost host programmable protocols	Single line X.25 support high performance	Interface to DEC system 10s and DECSYSTEM-20s	Router serving many CPUs on Ethernet LAN

¹ DMA (Direct Memory Access) is the ability to move multi-character messages between a communication line and CPU memory without interrupting the CPU. This capability yields higher performance.

² Multi-CPU Access refers to the ability to send a message directly to two or more CPU without routing the message through another CPU.

³ Modem Control refers to the number of signals available to control modem functionality on U.S. and European modems. Full modem control includes nine to eleven signals. Limited modem control is five signals and no modem control means only send and receive signals are present for each line.

⁴ Can be integrated with DECnet. PSI must be present (See Software Product Description for performance under PSI).

⁵ Aggregate throughput limited to 224 Kbits per second under X.25 Link Level 2.

⁶ Excluding VAX-2780/3780 and VAX-3271 protocol emulators.

* DECnet-VAX MicroVMS

* DECnet RSX

DECnet VAX

VAX/VMS

X.25 Access Routines

DECnet Micro/RXS

Micro VMS

DHV11

The *DHV11* is an eight-line asynchronous, direct memory access multiplexer that provides local or remote interconnection between Q-bus, PDP-11 and VAX systems and EIA RS232-C/CCITT V.28 terminals or other systems. The DHV11 operates at program or jumper-selectable speeds as great as 38,400 bits per second at full-duplex with full modem control on each line. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line.

The DHV11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents. An external cable is not included. BC22E-xx or BC22F-xx cables are recommended, depending on the functionality of the attached modem.

DHV11 Order Codes

Option	Order Code
Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DHV11-AA
Includes module, internal cables and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DHV11-AB
Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DHV11-AC
Includes module and kit for unshielded systems.	DHV11-A3
Base module only.	DHV11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DHV11	1 Quad Slot	4.3	0.5	27.3	2.9	0.5	B

DLVE1

The *DLVE1* is a single-line asynchronous interface that provides local or remote interconnection between Q-bus systems and EIA RS232-C/CCITT V.28 terminals. The DLVE1 operates at program or jumper-selectable speeds from 50 to 19,200 bits per second at full-duplex. Limited modem control is included. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line.

The DLVE1 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents. An external cable is not included. BC22D-xx is recommended for connection to terminals; BC22E-xx and BC22F-xx are recommended for connection to modems.

DLVE1 Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with PDP-11/23-S BA11-MB box and the (MicroVAX II) BA123 box.	DLVE1-DA
Includes module, internal cables, and I/O connection panel insert. For use with MicroPDP-11 BA23 box.	DLVE1-DB
Includes module, internal cables, and I/O connection panel insert. For use with PDP-11/23-PLUS H349 panel.	DLVE1-DC
Includes module and kit for unshielded systems. The kit contains a 7.6-meter (25-foot) cable that connects the DLVE1 module to the RS232 device.	DLVE1-D3
Base module only.	DLVE1-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DLVE1	1 Dual Slot	1.0	1.5	6.8	1.6	1.0	A

DLVJ1

The *DLVJ1* is a four-line asynchronous interface that provides local or remote interconnection between Q-bus systems and EIA RS232-C/CCITT V.28, EIA RS422/CCITT V.11, and EIA RS423/CCITT V.10 terminals. The *DLVJ1* acts as four separate devices, making program operations more convenient than they are with a multiplexer. The *DLVJ1* operates at program or jumper-selectable speeds from 150 to 38,400 bits per second at full-duplex. Limited modem control is included. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line.

The *DLVJ1* is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents. The external cable is not included. BC22D-xx is recommended for connection to terminals; BD22E-xx and BC22F-xx are recommended for connection to modems.

DLVJ1 Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DLVJ1-LA
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DLVJ1-LB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DLVJ1-LC
Base module only.	DLVJ1-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DLVJ1	1 Double Slot	1.0	0.25	8.0	1.0	1.0	B

DZQ11

The DZQ11 is a four-line asynchronous multiplexer that provides local or remote interconnection between PDP-11 and VAX Q-bus systems and EIA RS232-C/CCITT V.28 and EIA RS232-423-A/CCITT V.10 terminals or other systems. The DZQ11 operates at program-selectable speeds as great as 9,600 bits per second at full-duplex with limited modem control on each line.

The DZQ11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

DZQ11 Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box. DZQ11-DA	
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DZQ11-DB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DZQ11-DC
For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25-foot) cable that connects the DZQ11-M module to eight RS232 or RS423 devices.	DZQ11-D3
Base module only.	DZQ11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
DZQ11	1 Dual Slot	1.0	0.36	1.0	1.0	B

DZV11

The *DZV11* is a four-line asynchronous multiplexer that provides local or remote interconnection between Q-bus PDP-11 and VAX systems and EIA RS232-C/CCITT V.28 terminals or other systems. The DZV11 operates at program-selectable speeds as great as 9,600 bits per second at full-duplex with limited modem control on each line.

The DZV11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents. The DZV11 does not support half-duplex operations on modems. Cables are not included. BC22D-xx is recommended for connection to terminals; BC22E-xx and BC22F-xx are recommended for connection to modems.

DZV11 Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DZV11-DA
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DZV11-DB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DZV11-DC
For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25-foot) cable that connects the DZ11 module to the option.	DZV11-D3
Base module only.	DZV11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DZV11	1 Quad Slot	1.2	0.4	10.4	3.9	1.0	B

DEQNA

The Ethernet-to-Q-bus, high-performance, synchronous communications controller (DEQNA) connects Q-bus PDP-11 and VAX systems to Ethernet local area networks (LANs). The DEQNA has FCC-certification, complies fully with the Ethernet specification, and operates at 10 Mbits per second.

The DEQNA provides Ethernet data link layer functions and a portion of the physical channel functions. The DEQNA is supported under DECnet Phase IV software. Digital also provides documentation and device drivers so that users can write their own higher-level protocols for specialized applications and communications in multivendor environments.

The DEQNA allows communication with a maximum of to 1,023 addressable devices on an Ethernet. It physically and electrically connects to the Ethernet Coaxial Cable via Ethernet transceiver cables (BNE3C or BNE3A series). Refer to Figure 3.126 for all cable order codes and an H4000 Ethernet Transceiver or a Local Network Interconnect (DELNI). The transceiver cable can be a maximum of 45 meters (148 feet) in length for BNE3X series transceiver cable, or 11.25 meters for BNE4X series transceiver cable.

The Physical Address ROM (DEXMR) is needed to downline load software to a diskless Ethernet node with a DEUNA or DEQNA communications controller.

DEQNA Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DEQNA-KA
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DEQNA-KB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DEQNA-KC
Includes module and internal cables for use with unshielded systems.(PDP-11/23-PLUS) H349 panel.	DEQNA-K1

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DEQNA	1 Dual Slot	3.5	0.5	23.5	2.2	0.5	A

DPV11

The *DPV11* is a low-cost single-line synchronous programmable interface that provides local or remote interconnection between Q-bus systems and other computer systems with EIA RS232-C/CCITT V.28 or EIA RS232-C/CCITT V.11 interfaces. It operates at speeds as high as 56,000 bits per second at half- or full-duplex with full modem control. The *DPV11* is programmable for either byte-oriented protocols (DDCMP or BISYNC) or bit-oriented protocols (SDLC or HDLC). The *DPV11* is suited for interfacing to medium-speed synchronous lines for remote batch and remote job-entry applications.

The *DPV11* is compatible with Digital's family of modems and with the Bell 200 series modems and their equivalents.

DPV11 Order Codes

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DPV11-AA
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DPV11-AB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DPV11-AC
For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25 foot) cable that connects the <i>DPV11</i> module to the option.	DPV11-A3
Base module only.	DPVJ11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DPV11	1 Dual Slot	1.2	0.3	9.6	1.0	1.0	A

The *DMV11* is a microprocessor-controlled single-line synchronous interface that provides local or remote interconnection between Q-bus systems and other computer systems with EIA-RS232-C/CCITT V.28, CCITT V.35, or RS423/RS449 interfaces. The *DMV11* implements DDCMP in hardware and supports direct memory access data transfers, DECnet point-to-point or multipoint configurations, and full modem control. It operates at speeds from 56,000 bits per second to 19,200 bits per second (depending on the version selected) at half- or full-duplex.

Depending on the operating system and layered software, the DMV11 can support a maximum of 12 tributaries. In multipoint configurations, these tributaries can be other DMV11s or DMP11s. In point-to-point configurations, the DMV11 can communicate with other DMV11s, DMC11s, DUP11s, DPV11s, DMR11s, or DMP11s.

The DMV11 is compatible with Digital's family of modems and with Bell 200 series modems and their equivalents. External cables are not included.

DMV11 Order Codes

Option	Order Code
(Requires BC22E/F external cable)	
RS232-C interface. Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DMV11-AX
RS232-C interface. Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DMV11-AW
RS232-C interface. Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DMV11-AV
RS232-C interface. Includes module and internal cables. For use with CPUs that do not have a I/O connection panel. Kit contains a 3-meter (10-foot) cable that connects the DMV11 module to the panel.	DMV11-AZ
Base module only.	DMV11-M
RS423/RS449	
RS423/RS449 interface. Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DMV11-FA
RS423/RS449 interface. Includes module, internal cables and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DMV11-FB
RS423/RS449 interface. Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DMV11-FC
RS423/RS449 interface. Includes module and internal cables. For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25-foot) cable that connects the DMV11 module to the panel.	DMV11-F3

Option	Order Code
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V.35

V.35 interface. Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box. Includes a BC17E cable for connection to modem.	DMV11-BA
V.35 interface. Includes module, internal cables and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box. Includes a BC17E cable for connection to modem.	DMV11-BB
V.35 interface. Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel. Includes a BC17E cable for connection to modem.	DMV11-BC
V.35 interface. Includes module and internal cables. For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25 foot) cable that connects the DMV11 module to the panel.	DMV11-B3
Base module only.	DMV11-N

Integral Modem

Integral modem. Includes module, internal cables and I/O connection panel insert. For use with (PDP-11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DMV11-CA
Integral modem. Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DMV11-CB
Integral modem. Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DMV11-CC
Integral modem. Includes module and internal cables. For use with CPUs that do not have an I/O connection panel. Kit contains a 7.6-meter (25-foot) cable that connects the DMV11 module to the panel.	DMV11-C3

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DMV11-Ax	1 Quad Slot	3.4	0.4	21.6	2.0	1.0	B
DMV11-Bx	1 Quad Slot	3.4	0.4	21.6	2.0	1.0	A
DMV11-Fx	1 Quad Slot	3.4	0.4	21.6	2.0	1.0	B
DMV11-Cx	1 Quad Slot	3.4	0.3	21.6	2.0	1.0	A

DUV11

The *DUV11* is a single-line, double-buffered, program-controlled communications interface. It is used to establish a data communications link between any Q-bus-based processor and a Bell 201 synchronous modem or equivalent. The module is fully programmable with respect to sync characters and parity selection. The *DUV11* is designed for applications using character-oriented protocols, and controls the modem for half- or full-duplex operation. It also interfaces synchronous and isochronous communications data (isochronous operation is essentially asynchronous data transmission over a synchronous modem). It transmits EIA/CCITT data at rates as great as 9,600 bits per second.

Option	Order Code
Includes module, internal cables, and I/O connection panel insert. For use with (PDP11/23-S) BA11-MB box and the (MicroVAX II) BA123 box.	DUV11-AA
Includes module, internal cables, and I/O connection panel insert. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	DUV11-AB
Includes module, internal cables, and I/O connection panel insert. For use with (PDP-11/23-PLUS) H349 panel.	DUV11-AC
Includes module and internal cables. For use with CPUs that do not have a I/O connection panel. Kit contains a 7.6-meter (25-foot) cable that connects the <i>DUV11</i> module to the panel.	DUV11-A3
Base module only.	DUV11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DUV11	1 Quad Slot	1.2	0.39	10.4	3.9	1.0	B

KMV11-A

The *KMV11-A* is a high-performance, direct memory access, single-line programmable communications controller that provides interconnection between Q-bus systems and EIA RS232-c/CCITT V.28, EIA RS-422/CCITT V.11, or RS423/CCITT V.10 interfaces. It is capable of communications speeds as great as 64 Kbytes per second. It is used on the PDP-11/23, and the PDP-11/23-PLUS. It utilizes the Micro/T11 processor to perform user-defined communications functions, freeing the host to do more application computations.

The KMV11-A can be programmed in synchronous or asynchronous modes. It also provides full modem support for the Bell 200 series or equivalent and European PPT-approved modems.

Software currently available includes:

Software Order Codes

Option	Order Code
For RSX11M/MPLUS implementation of HDLC/SDLC (frame level) communications applications.	QJS32/39
For RSX11M/MPLUS/S per second implementation of X.25 link level software allowing the customer to build network.	QJS97-x*
For RSX11M/MPLUS/S per second availability of a package of development tools.	QJS98-x*

KMV11 Order Codes

Option	Order Code
Supports RS232-C or CCITT V.28 operation at 19.2 Kbytes per second. For use on PDP-11/23-PLUS systems. External cable not included, BC22F-xx is the recommended cable.	KMV1A-AA
Supports RS232-C or CCITT V.28 operation at 19.2 Kbytes per second. For use on PDP-11/23-PLUS MicroPDP systems. External cable not included, BC22F-xx is the recommended cable.	KMV1A-AB
Supports RS232-C or CCITT V.28 operation at 19.2 Kbytes per second. For use on PDP-11/23-PLUS systems. External cable not included, BC22F-xx is the recommended cable.	KMV1A-AC
Supports RS449/422A or CCITT V.11 operation to a maximum of 64 Kbytes per second. For use on PDP-11/23-S systems. External cable not available from Digital.	KMV1A-EA
Supports RS449/422A or CCITT V.11 operation to a maximum of 64 Kbytes per second. For use on MicroPDP systems. External cable not available from Digital.	KMV1A-EB
Supports RS449/422A or CCITT V.11 operation to a maximum of 64 Kbytes per second. For use on PDP-11/23-PLUS systems. External cable not available from Digital.	KMV1A-EC
Supports RS449/423A or CCITT V.10 operation to a maximum of 64 Kbytes per second. For use on PDP-11/23-S systems. External cable not available from Digital.	KMV1A-FA
Supports RS449/423A or CCITT V.10 operation to a maximum of 64 Kbytes per second. For use on MicroPDP systems. External cable not available from Digital.	KMV1A-FB
Supports RS449/423A or CCITT V.10 operation to a maximum of 64 Kbytes per second. For use on PDP-11/23-PLUS systems. External cable not available from Digital.	KMV1A-FC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
KMV11-AA	1 Quad Slot	2.6	0.2	15.4	3.0	1.0	A

Single-Line Interface Devices

DL11

The *DL11* is a single-line asynchronous interface that provides local and remote interconnection between UNIBUS systems and EIA RS232-C/CCITT V.28 or 20-mA devices (terminals and other computer systems). The *DL11* operates at switch-selectable speeds from 50 to 9,600 bits per second at half- or full-duplex. Full modem control is available on specific versions.

Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line. The ability to handle a wide range of terminals or communications lines is provided by switch-selectable character size, parity generation/checking, and stop bit length.

The *DL11* is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

DL11-Ax

The *DL11-A* models feature EIA/CCITT V.28 interface with a modem control and jumper-selectable options. They are compatible with Digital's family of modems and with Bell 100 and 200 series or their equivalent, and include a BC22D-25 cable.

Note: Customer must specify data rate from the following speeds: 50, 75, 110, 150, 134.5, 200, 300, 600, 1,200, 1,800, 2,400, 4,800, or 9,600 bits per second.

DL11 Order Codes

Option	Order Code
EIA/CCITT V.28 interface with modem control for use with PDP-11/24 and PDP-11/44 shielded cabinets.	DL11-AD
EIA/CCITT V.28 interface with modem control for use with unshielded cabinet models. A 7.6-meter (25-foot) cable, and an adapter bracket are included.	DL11-A3
Base module only.	DL11-M

DL11-Dx

The *DL11-D* models feature EIA RS232-C/CCITT serial line interface and a line frequency realtime clock without modem control. They have switch-selectable options, and include a BC05C-25 cable. **Note:** Data rates are switch-selectable and must be specified from the following speeds: 110, 150, 300, 600, 1,200, 2,400, 4,800, or 9,600 bits per second. Character formats are switch-selectable.

DL11-Dx Order Codes

Option	Order Code
EIA RS232-C/CCITT serial line interface for use with PDP-11/24 and PDP-11/44 shielded cabinets.	DL11-DD
EIA RS232-C/CCITT serial line interface for use with unshielded cabinet models. It includes a 3-meter (10-foot) cable and an adapter bracket.	DL11-D1
EIA RS232-C/CCITT serial line interface for use with unshielded cabinet models. It includes a 7.6-meter (25-foot) cable and an adapter bracket.	DL11-D3

DL11-Hx

The *DL11-H* models feature 20-mA serial line interface and a line frequency realtime clock. They have switch-selectable options and include a BC05M-04 cable for terminal connection. **Note:** Data rates are switch-selectable and must be specified from the following speeds: 110, 150, 300, 600, 1,200, 2,400, 4,800, or 9,600 bits per second. Character formats are switch-selectable.

DL11-Hx Order Codes

Option	Order Code
20-mA serial line interface for use with PDP-11/24 and PDP-11/44 shielded cabinets.	DL11-HD
20-mA serial line interface for use with unshielded cabinet models. A 7.6-meter (25-foot) cable and an adapter bracket are included.	DL11-H3

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DL11-Ax	1 Quad Slot	1.8	0.05	0.15	1.0	1
DL11-Dx	1 Quad Slot	2.0	0.05	0.15	1.0	1
DL11-Hx	1 Quad Slot	2.0	0.05	0.15	1.0	1

Multiline Interface Devices

DZ11

The *DZ11* is a low-cost, eight-line asynchronous multiplexer that provides low-cost local or remote interconnection between UNIBUS PDP-11 and VAX systems and as many as eight EIA RS232-C/CCITT V.28 or 20-mA terminals. The DZ11 operates at program-selectable speeds as high as 9,600 bits per second full-duplex. Limited modem control is provided.

The DZ11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

The new base option and cabinet kit method of ordering DZ11s provides eight lines of capacity at a time. The -DD, -D1, -HD, -H1 cabinet kits contain an I/O connector panel insert that services eight asynchronous lines. If you have an unshielded cabinet and a DZ11-C with unused H317 distribution panel capacity, then order one DZ11-D option to upgrade and utilize the available H317 capacity. Once the available capacity is filled, order new modules and the appropriate cabinet kits.

DZ11-Dx

The *DZ11-D* models feature an eight-line multiplexer with an I/O connection panel insert for EIA/CCITT terminals. Includes modem control for use with Digital's family of modems and with Bell 100 and 200 series modems or their equivalent. External cables for terminals are not included. For connection to modems one BC22E-xx is recommended per line. For local connection of EIA/CCITT terminals, order one BC22D-xx per line. This option must be ordered with the system in which it is to be installed.

DZ11-Dx Order Codes

Option	Order Code
Eight-line multiplexer for use with PDP-11/24 and PDP-11/44, and VAX 11/780 shielded cabinets.	DZ11-DD
Eight-line multiplexer for use with the VAX 11/730 and 750 shielded cabinets.	DZ11-DE
Eight-line multiplexer for use with unshielded cabinet models. A 3-meter (10-foot) cable and an adapter bracket are included.	DZ11-D1
Eight-line multiplexer for use with unshielded cabinet models. A 3-meter (10-foot) cable and an adapter bracket are included. So is a 16-line H317 distribution panel that can be used to connect as many as two DZ11 options. This kit is for customers who need the form, fit, function, and spares required by older hardware.	DZ11-D2
Base module only.	DZ11-M

DZ11-Hx

The *DZ11-H* models feature an eight-line multiplexer with I/O connection panel insert for use with 20-mA current loop terminals. Terminal cables are not included. Order one BC04R-xx cable per line for connection of 20-mA terminals. This option must be ordered with the system in which it is to be installed.

DZ11-Hx Order Codes

Option	Order Code
Eight-line multiplexer for use with PDP-11/24, PDP-11/44, and VAX 11/780 shielded cabinets.	DZ11-HD
Eight-line multiplexer for use with VAX-11/730, and VAX 11/750 shielded cabinets.	DZ11-HE
Eight-line multiplexer for use with unshielded cabinet models. An adapter bracket is included.	DZ11-H1
Eight-line multiplexer for use with unshielded cabinet models. It includes a 16-line H317 distribution panel, and can be used to connect as many as two DZ11 options. This kit is for customers who need the form, fit, function, and spares required by older hardware.	DZ11-H2
Base module only.	DZ11-N

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DZ11-Dx	1 Hex Slot	2.2	0.10	0.13	1.0	4
DZ11-Hx	1 Hex Slot	2.1	0.12	0.40	1.0	4

Serial Communications Interface

DZ32

DZ32 asynchronous serial communications interfaces with full modem control can be used on all VAX family processors. They support split speed control for send and receive as well as full modem control for each line. *DZ32* models are certified for attachment to the lines of European PTTs.

DZ32 Order Codes

Option	Order Code
Eight-line EIA/CCITT multiplexer comprises a single UNIBUS hex-module and a panel insert for use with (VAX 11/780) shielded cabinets. External cables not included. For connection to modems, one BC22F-xx per line is recommended.	DZ32-AD
Eight-line EIA/CCITT multiplexer comprise a single UNIBUS hex-module and a panel insert for use with (VAX 11/730 and 750) shielded cabinets. External cables not included. For connection to modems, one BC22F-xx per line is recommended.	DZ32-AE
Eight-line EIA/CCITT multiplexer comprise a single UNIBUS hex-module and a panel insert for use with cabinets with old style distribution panel. External cables not included. For connection to modems, one BC22FF-xx per line is recommended.	DZ32-A1
Eight-line EIA/CCITT multiplexer comprise a single UNIBUS hex-module and a panel insert for use with cabinets without I/O connection panels. Adapter bracket included. External cables are not included. For connection to modems, one BC22F-xx per line is recommended.	DZ32-A2

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DZ32	1 Hex Slot	5.2	0.24	0.39	1.0	4

Multipurpose Communications Controllers

DMF32

The DMF32, a multifunction communications controller, provides inter-connection between modems and terminals and VAX UNIBUS systems. The DMF32 consists of an eight-line asynchronous multiplexer, a single-line synchronous interface, and a general purpose parallel interface. It is supported by the VAX/VMS operating system, DECnet-VAX networking software, and VAX PSI communications software.

The eight-line asynchronous multiplexer operates at speeds as high as 19,200 bits per second at full-duplex in either the DMA mode or the SILO (first-in, first-out) mode. Two lines have full modem control and split-speed capability; the other six lines have no modem control and are for connecting local terminals only. The single-line synchronous interface operates at speeds up to 19,200 bits per second in DMA mode with full modem control and support for both bit- and byte-oriented protocols. The general purpose parallel interface operates with either a line-printer (in DMA mode) or a user-specific device (DMA mode or SILO mode). The DMF32 is compatible with Digital's family of modems, Bell 200 series modems, and their equivalents.

DMF32 Order Codes

Option	Order Code
DMF32 for use with VAX-11/780-Series shielded cabinets.	DMF32-LD
DMF32 for use with VAX-11/750 and 730 shielded cabinets.	DMF32-LE
DMF32 for use with cabinets without I/O connection panels. Adapter bracket included.	DMF32-L1
Base module only.	DMF32-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DMF32	1 Hex Slot	8.0	0.5	0.5	1.0	4

DH11

The *DH11* is a 16-line asynchronous multiplexer with direct memory access that provides local and remote interconnection between UNIBUS (PDP-11 only) systems and EIA RS232-C/CCITT V.28 terminals. The DH11 operates at program-selectable speeds up to 9600 bits per second at half- or full-duplex. Full modem control is available on specific versions. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line. The ability to handle a wide range of terminals or communications lines is provided by switch-selectable character size and stop bit length.

The DH11 is compatible with Digital's family of modems and with Bell 100 and 200 series modems and their equivalents.

The DH11 is supported only on PDP-11 UNIBUS software systems.

DH11-Ax

The *DH11-A* models feature an RS232-C interface. They include a modem control. External cables are not included, so for connection to modems one BC22E-xx is recommended per line. For local connection of EIA/CCITT terminals, order one BC22D-xx per line.

DH11-Ax Order Codes

Option	Order Code
RS232-C interface and modem control for use with PDP-11/24, and PDP11-/44 shielded cabinets.	DH11-AZ
RS232-C interface and modem control for use with unshielded cabinets. An adapter bracket is included.	DH11-A1
RS232-C interface and modem control for use by customers who need the form, fit, function, and spares by older hardware. An adapter bracket is included.	DH11-A2
Base module only.	DH11-M

DH11-Dx

The *DH11-D* models feature a 20-mA interface. It does not include a modem control. External cables are not included. For local connection of EIA/CCITT terminals, order one BC22D-xx per line.

DH11-Dx Order Codes

Option	Order Code
RS232-C interface and modem control for use with unshielded cabinet models. An adapter bracket is included.	DH11-D1
RS232-C interface and modem control for use by customers who need the form, fit, function, and spares required for older hardware. An adapter bracket is included.	DH11-D2

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DH11-Ax	2 SU	10.8	0.4	0.65	3.0	8
DH11-Dx	2 SU	8.6	0.1	0.34	2.0	8

DHU11

The *DHU11* is a 16-line asynchronous multiplexer with direct memory access that provides local and remote interconnection between UNIBUS PDP-11 and VAX systems and EIA-RS232-C/CCITT V.28 or EIA-RS423-A/CCITT V.10 terminals. The DHU11 is also Digital's lowest cost 16-line asynchronous multiplexer. It operates at program-selectable speeds up to 19,200 bits per second at half- or 38,400 full-duplex. Full modem control is available on all 16 lines. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive lines (this product required VMS version four).

DHU11 Order Codes

Option	Order Code
RS232-C/CCITT V.28/RS423-A/CCITT V.10. Includes module, internal cables, and I/O connection panel. For use with VAX-11/780, and PDP-11/24 & 44 systems.	DHU11-AD
RS232-C/CCITT V.28/RS423-A/CCITT V.10. Includes module, internal cables, and I/O connection panel. For use with VAX-11/750 & 730 CPU cabinets.	DHU11-AE
RS232-C/CCITT V.28/RS423-A/CCITT V.10. Includes module, internal cables, adapter bracket, and I/O connection panel. For use with unshielded systems.	DHU11-A1
Base module only.	DHU11-M

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+ 5V	+ 15V	-15V	AC	DC	
DHU11	1 Hex Slot	6.0	0.4	0.4	2.2	1.0	8

DMZ32

The DMZ32 is a full modem control 24-line asynchronous multiplexer with direct memory access on transmit lines that provides local interconnection between VAX UNIBUS systems and up to 24 EIA RS232-C/CCITT V.28 terminals. The DMZ32 operates at program-selectable speeds up to 19,200 bits per second at full- or half-duplex with full modem control on each line. Split-speed transmit and receive rates are supported on each line making more efficient use of communications facilities by reducing the software demand for the receive line.

By multiplexing transmission between the module and the distribution panel, the DMZ32 can be configured in a local or a remote location. In the local configuration, the DMZ32 can be mounted in the H9642-FD and H9652-MB/MH UNIBUS expander cabinets or any existing 19-inch cabinet. **Note:** Manufacturing will not install the distribution panel locally.

In the remote configuration, the DMZ32 distribution panel can be mounted almost one mile (5,000 feet or 1524 meters) from the VAX. With the remote capability of the DMZ32, the distribution panel can be mounted in any 19-inch cabinet including data and PBX cabinets.

DMZ32 Order Codes

Option	Order Code
Includes module, internal cables, distribution panel, and modem control. Cables not included. For connection to modems, one BC22E per line is recommended. For connection to terminals or printers, one BC22E per line is recommended.	DMZ32-AY
Includes module, internal cables, and distribution panel. Modem control and cables not included. For connection to terminals or printers, one BC22E per line is recommended.	DMZ32-DY
Modem upgrade kit.	DMZ32-N

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+ 5V	+ 15V	-15V	AC	DC	
DMZ32	1 Hex Slot	9.0	150 ma		6.0	1.0	8

Single-line Programmable Interface

DUP11

The *DUP11* is a high performance single-line synchronous programmable interface that provides remote interconnection between UNIBUS PDP-11 and VAX systems and other computer systems with RS-232-C/CCITT V.28 interface. It operates at speeds as fast as 9600 bits per second at half- or full-duplex with full modem control. The DUP11 is programmable for either byte-oriented protocols (DDCMP or BISYNC) or bit-oriented protocols (SDLC or HDLC). The DUP11 is suited for interfacing to a medium-speed synchronous line for remote batch and remote job entry applications.

The DUP11 is compatible with Digital's family of modems and with the Bell 200 series and their equivalents.

DUP11 Order Codes

Option	Order Code
For use with (PDP-11/24 & 44, and VAX 11/780) shielded cabinets.	DUP11-AD
For use with (VAX 11/730 & 750) shielded cabinets.	DUP11-AE
For use with unshielded cabinet models. Includes 3-meter (10-foot) cable and adapter bracket.	DUP11-A1
For use with unshielded cabinet models. Includes 7.6-meter (25-foot) cable and adapter bracket.	DUP11-A3

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DUP11	1 Hex Slot	3.6	0.08	0.08	1.0	1

Point to Point Interfaces

DMR11

The *DMR11* is a high performance microprocessor-controlled single-line synchronous interface that provides local or remote interconnection between UNIBUS PDP-11 and VAX systems and other computer systems with EIA RS-232-C/CCITT V.28, CCITT V.35, EIA RS-423/RS-449, or EIA RS-422/RS-449 interfaces. The DMR11 implements DDCMP in hardware and supports direct memory access data transfers, DECnet point-to-point configurations, and full modem control. It operates at speeds up to 1 Mbyte per second at half- or full-duplex. The DMR11 can communicate with another DMR11, DMV11, DMP11, or any other synchronous interface that implements DDCMP Version 3.1 or 4.0.

The DMR11 is compatible, depending on the version selected, with Digital's family of modems and with Bell 200 series and Bell 500A L1/5 modems and their equivalents.

DMR11-Ax

The DMR11-A models feature interfaces to RS232-C synchronous modems (Bell series 200 compatible) at speeds up to 19.2 Kbytes per second, and include a data set control. External cable not included; order BC22E-xx cable.

DMR11-Ax Order Codes

Option	Order Code
Interfaces to RS232-C synchronous modems, for use with VAX-11/730 & 750 shielded cabinets.	DMR11-AY
Interfaces to RS232-C synchronous modems, for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMR11-AZ
Interfaces to RS232-C synchronous modems, for use with unshielded cabinets and includes a 3-meter (10-foot) cable and an adapter bracket.	DMR11-A1

DMR11-Bx

The DMR11-B models feature interfaces to CCITT V.35/DDS synchronous modems (Bell 500A L1/5 or equivalent) at speeds up to one Mbyte per second, and include a data set control, and a BC17E cable for modem connection.

DMR11-Bx Order Codes

Option	Order Code
Interfaces to CCIT V.35/DDS synchronous modems, for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMR11-BD
Interfaces to CCIT V.35/DDS synchronous modems, for use with VAX-11/730 & 750 shielded cabinets.	DMR11-BE
Interfaces to CCIT V.35/DDS synchronous modems, for use with unshielded cabinets. It includes a 3-meter (10-foot) cable, and an adapter bracket.	DMR11-B1
Interfaces to CCIT V.35/DDS synchronous modems, model for use with unshielded cabinets. It includes a 7.6-meter (25-foot) cable, and an adapter bracket.	DMR11-B3

DMR11-Cx

The DMR11-C models feature an integral modem, for local interconnection. Supports switch-selectable speeds over the following distances:

Frequency	Distance	Cable
1 MB/S	1830m (6,000 ft)	BC55S
500 KB/S	2135m (7,000 ft)	BC55S
250 KB/S	2440m (8,000 ft)	BC55S
56 KB/S	4800m (16,000 ft)	BC55T

External cables not included. Requires BC55S or BC55T external cable. **Note:** Earlier versions of this option used different cables. To connect the BC55S or BC55T to the earlier BC55N and BC55M cables, BC56/A/B/C/D adapter cables are available. See the Communication Cable Chart in this section.

DMR11-Cx Order Codes

Option	Order Code
Integral modem interface for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMR11-CD
Integral modem interface for use with VAX-11/730 & 750 shielded cabinets.	DMR11-CE
Integral modem interface model for use with unshielded cabinets. It includes a 3-meter (10-foot) cable, and an adapter bracket.	DMR11-C1

DMR11-Ex

The DMR11-E models feature interfaces to RS422/CCITT V.24 synchronous modems, and support speeds up to one Mbyte per second (FDX). They include a data set control for switched network operation. External cable is not included; cable not available through Digital.

DMR11-Ex Order Codes

Option	Order Code
RS422/RS449 interface for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMR11-ED
RS422/RS449 interface for use with VAX-11/730 & 750 shielded cabinets.	DMR11-EE
RS422/RS449 interface for use with unshielded cabinets. Includes 3-meter (10-foot) cable, and adapter bracket.	DMR11-E1

DMR11-Fx

The DMR11-F models interface to RS423/CCITT V.24 synchronous modems at speeds as high as 56 Kbytes per second, and include a data set control. External cable not included; order BC55D-xx cable.

DMR11-Fx Order Codes

Option	Order Code
RS423/RS449 interface model for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMR11-FD
RS423/RS449 interface model model for use with VAX-11/730 & 750 shielded cabinets.	DMR11-FE
RS423/RS449 interface model for use with unshielded cabinets. Includes 3-meter (10-foot) cable, and adapter bracket.	DMR11-F1

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DMR11-Ax	2 Hex Slots	12.0	0.08	0.19	1.0	1
DMR11-Bx	2 Hex Slots	12.0	0.11	0.20	1.0	2
DMR11-Cx	2 Hex Slots	12.0	0.08	0.19	1.0	1
DMR11-Ex	2 Hex Slots	12.0	0.11	0.20	1.0	1
DMR11-Fx	2 Hex Slots	12.0	0.11	0.20	1.0	2

Auxiliary Communications Microprocessors

KMS11-BD

The KMS11-BD is an eight-line programmable synchronous intelligent front-end that provides as many as eight lines of interconnection between UNIBUS PDP-11 and VAX systems and other devices with EIA RS-232-C/CCITT V.28, MIL-188-144 unbalanced, or CCITT V.35 (with optional hardware module) interfaces. The KMS11-BD operates at speeds as high as 56 Kbits per second in half- or full-duplex with full modem control. The KMS11-BD supports direct memory access data transfers, the VAX PSI and RSX-11 PSI software packages, and the X.25, HDLC, BSC, and BTS protocols.

Electrical interfaces supported include RS-232-C/CCITT V.28, MIL-188-144 unbalanced, and CCITT V.35 (with optional hardware module). Includes a DD11-DK double system unit and all internal cables. External cables are not included. Recommended cables are BC22F.

KMS11-BD Order Code

Option

Order Code

Eight-line communications multiplexer including an auxiliary processor unit, line terminator, modem control unit, I/O connection panel, double system unit, and internal cables.

KMS11-BD

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+ 5V	+ 15V	-15V	AC	DC	
KMS11-BD	2 System Units	12.5	1.5	0.5	7.0	2.0	8
KMS11-BE	3 Hex Slots	12.5	1.5	0.5	7.0	2.0	8

KMS1P

The *KMS1P* is a one-line programmable synchronous intelligent communications controller that provides interconnection between UNIBUS PDP-11 and VAX systems with EIA RS-232-C/CCITT V.28, EIA RS-423-A/CCITT V.10, CCITT V.35, or RS-422-A/CCITT V.11 interfaces. The microprocessor-based device operates at speeds as fast as 64K bits per second in half- or full-duplex with full modem control. The KMS1P supports direct memory access data transfers, the VAX PSI software package, and the X.25 protocol.

KMS1P Order Codes

Option

Order Code

X.25, EIA RS-232-C/CCITT V.28 interface for an unshielded cabinet.

KMS1P-AI

X.25, EIA RS-232-C/CCITT V.28 interface for a shielded cabinet.

KMS1P-AD

X.25, CCITT V.35 interface for an unshielded cabinet.

KMS1P-B1

X.25, CCITT V.35 interface for a shielded cabinet.

KMS1P-BD

X.25, EIA RS-422/CCITT V.11 interface for an unshielded cabinet.

KMS1P-EI*

X.25, EIA RS-422/CCITT V.11 interface for a shielded cabinet.

KMS1P-ED*

X.25, EIA RS-423/CCITT V.10 interface for an unshielded cabinet.

KMS1P-F1

X.25, EIA RS-423/CCITT V.10 interface for a shielded cabinet.

KMS1P-FD

*VAX PSI is not supported on this variation.

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+ 5V	+ 15V	-15V	AC	DC	
KMS1-P	2 Hex Slots	10.5	0.15	0.2	5.0	1.0	1

KCT32

The KCT32 is a programmable communications interface based on the Digital DCT11 chip. Its two lines provide asynchronous or synchronous communication between VAX systems and other devices with EIA RS-232-C/CCITT V.28, EIA RS-422/CCITT V.11 or RS-423/CCITT V.10 interfaces for networking or custom communications applications. The KCT32 operates at speeds up to 64 Kbits per second for two asynchronous lines, 128 Kbits per second for one asynchronous line, 64 Kb per second for two synchronous lines and 160 Kbits per second for one synchronous line. The KCT32 supports direct memory access with full modem control on each line. It has 56 Kbytes of user-programmable memory for implementation of custom communications functions.

Software Order Code

Option	Order Code
VAX-11 KCT32	Qx128-xx

KCT32 Order Codes

Option	Order Code
CCITT V.35 version with basic system unit, M7099 CCITT V.35 interface quad board, H3004 CCITT V.35 interface panel and H3250-00 test conductor.	KCT32-AB
Basic system unit with M7487 synchronous/asynchronous dual line T11 communications board.	KCT32-AD
EIA RS-422/CCITT V.11 version with basic system unit, H3002, EIA RS-422/CCITT V.11 interface panel and H3251-x test connector.	KCT32-AE
EIA RS-232/CCITT V.28 version with basic system unit, H3001, EIA RS-232/CCITT V.28 interface panel and H3251-x connector modem test.	KCT32-FA
EIA RS-423/RS449 version with basic system unit, H3003, EIA RS-423/RS-449 interface panel and H3251-x EIA RS-423/RS-449 test connector.	KCT32-FF

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
KCT32	2 Hex Slots	6.0	0.0	0.0	1.0	1

Multipoint Synchronous Interfaces

DEUNA

The Ethernet-to-UNIBUS high performance synchronous communications controller (DEUNA connects VAX and UNIBUS PDP-11 systems to Ethernet Local Area Networks (LANs). The DEUNA operates at 10 Mbits per second.

The DEUNA provides Ethernet data link layer functions and a portion of the physical channel functions. The DEUNA is supported under DECnet Phase IV software. Digital also provides documentation and device drivers so that users can write their own higher-level protocols for specialized applications and communications in multivendor environments. The DEUNA allows communication with up to 1,023 addressable devices on an Ethernet. It physically and electrically connects to the Ethernet Coaxial Cable via Ethernet transceiver cables (BNE3C or BNE3A series). The meters for BNE4X series transceiver cable.

DEUNA Order Code

Option

Order Code

Ethernet to UNIBUS controller.

DEUNA-AA

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+ 5V	+ 15V	-15V	AC	DC	
DEUNA-AA	2 Hex Slots	15.0	0.0	1.0	4.0	2.0	2

Product Information

DMP11

The *DMP11* is a high performance microprocessor-controlled single-line synchronous interface that provides local or remote interconnection between UNIBUS PDP-11 and VAX systems and other computer systems with EIA RS-423/CCITT V.10, EIA RS-422/CCITT V.11, EIA RS-232-C/CCITT V.28, or CCITT V.35 interfaces. the DMP11 implements DDCMP in hardware and supports direct memory access data transfers, DECnet point-to-point or multipoint configurations, and full modem control. The DMP11 operates at half-duplex at 1 Mbits per second and half- and full-duplex for all other rates.

Depending on the operating system and layered software, the DMP11 can support up to 32 tributaries. In multipoint configurations, these tributaries can be other DMP11s, DMV11s, or DMF32s (on VAX systems). In point-to-point configurations, the DMP11 can communicate with any other synchronous interface that implements DDCMP Version 3.1 or 4.0.

The DMP11 is compatible, depending on the version selected, with Digital's family of modems and with Bell 200 series and Bell 500a 11/5 modems and their equivalents.

DMP11-Ax

The *DMP11-A* models feature interfaces to RS232-C synchronous modems (Bell series 200 compatible) at speeds up to 19.2 Kbytes per second, and include a data set control. External cable not included; order BC22E-xx cable.

DMP11-Ax Order Codes

Option	Order Code
Interfaces to RS232-C synchronous modems, for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMP11-AZ
Interfaces to RS232-C synchronous modems, for use with VAX-11/750 & 730 shielded cabinets.	DMP11-AY
Interfaces to RS232-C synchronous modems, for use with unshielded cabinets. Adapter bracket included.	DMP11-A1

The *DMP11-B* models feature interfaces to CCITT V.35/DDS synchronous modems (Bell 500A L1/5 or equivalent) at speeds up to 56 Kbytes per second, and include a data set control. Also included is a BC17E cable for modem connection.

DMP11-Bx Order Codes

Option	Order Code
Interfaces to CCITT V.35/DDS synchronous modems, for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMP11-BD
Interfaces to CCITT V.35/DDS synchronous modems, for use with VAX-11/750 & 730 shielded cabinets.	DMP11-BE
Interfaces to CCITT V.35/DDS synchronous modems, for use with unshielded cabinets. Includes a 3-meter (10-foot) cable, and an adapter bracket.	DMP11-B1
Interfaces to CCITT V.35/DDS synchronous modems, for use with unshielded cabinets. Includes a 7.6-meter (25-foot) cable, and an adapter bracket.	DMP11-B3

DMP11-Cx

The *DMP11-C* models feature an integral modem, for local interconnection. It does not include an external cable. A BC55S or BC55T must be ordered. 'C' models support switch selectable speeds. At the following distances, maximum speeds supported are:

Frequency	Distance	Cable
1 MB/S	1830m (6,000 ft)	BC55S
500 KB/S	2135m (7,000 ft)	BC55S
250 KB/S	2440m (8,000 ft)	BC55S
56 KB/S	4800m (16,000 ft)	BC55T

External cables not included; Requires BC55S or BC55T external cable. **Note:** Earlier versions of this option used different cables. To connect the BC55S or BC55T to the earlier BC55N and BC55M cables, BC56D/E adapter cables are available.

DMP11-Cx Order Codes

Option	Order Code
Integral modem interface for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMP11-CD
Integral modem interface for use with VAX-11/750 & 730 shielded cabinets.	DMP11-CE
Integral modem interface for use with unshielded cabinets. An adapter bracket is included.	DMP11-C1

The *DMP11-E* models include interfaces to RS422/CCITT V.11 synchronous modems, and support speeds up to one Mbyte per second (HDX) or 500 Kbytes per second (FDX). They include a data set control for switched network operation. An external cable is not included; cable not available through Digital.

DMP11-Ex Order Codes

Option	Order Code
RS422/RS449 interface for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMP11-ED
RS422/RS449 interface for use with VAX-11/750 & 730 shielded cabinets.	DMP11-EE
RS422/RS449 interface for use with unshielded cabinets. Adapter bracket included.	DMP11-E1

DMP11-Fx

The *DMP11-F* models feature interfaces to RS423/CCITT V.10 synchronous modems at speeds up to 56 Kbytes per second, and include a data set control. An external cable is not included; order BC55D-xx cable.

DMP11-Fx Order Codes

Option	Order Code
RS423/RS449 interface for use with PDP-11/24 & 44, and VAX-11/780-Series shielded cabinets.	DMP11-FD
RS423/RS449 interface for use with VAX-11/750 & 730 shielded cabinets.	DMP11-FE
RS423/RS449 interface for use with unshielded cabinets. Adapter bracket included.	DMP11-F1

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DMP11-Ax	2 Hex Slots	12.0	0.08	0.19	1.0	1
DMP11-Cx	2 Hex Slots	12.0	0.08	0.19	1.0	2
DMP11-Ex	2 Hex Slots	12.0	0.08	0.19	1.0	1
DMP11-Bx	2 Hex Slots	12.0	0.10	0.20	1.0	1
DMP11-Fx	2 Hex Slots	12.0	0.10	0.20	1.0	2

Statistical Multiplexers

DZS11

The *DZS11* is both a terminal concentrator and a statistical multiplexer. As a terminal concentrator, it uses a single, 19.2-Kbit per second synchronous link to connect up to eight EIA RS232-C/CCITT V.28 asynchronous terminals (VT100-AA or -AB) to UNIBUS systems. As a statistical multiplexer, the DZS11 dynamically divides communication line capacity according to each user's current needs. To a host system, the DZS11 looks like a standard, asynchronous DZ11 interface with a maximum line speed of 9600 bits per second.

The DZS11 has two major assemblies: a terminal concentrator and a host interface. The terminal concentrator slips into the back of a VT100-AA or -AB terminal. The host interface plugs directly into a UNIBUS system.

DZS11 Order Codes

Option	Order Code
DZ11-EA-compatible interface between the UNIBUS and as many as two terminal multiplexers (VT1XX-EB).	DZS11-EA (Host)
Eight-channel multiplexer.	VT1XX-EB (Terminal)

For more information contact a Computer Special Systems Representative.

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 15V	-15V	
DECmux					
DZS11-EA	1 Panel Unit, 1 Hex Slot	3.35	0.13	0.02	1
VT1XX-EB	VT100-AB	Supplied by VT100			N/A

PCL11-B

The *PCL11-B* is a parallel communications link that provides multipoint interconnection of as many as 16 processors in a local distributed network. The PCL11 operates at speeds as high as one Mbyte per second using direct memory access at full duplex. The speed depends on the bus length. Maximum bus length is 91 meters (300 feet). BC17U and BC17T cables are included.

PCL11 Order Code

Option	Order Code
Parallel communications link node.	PCL11-B

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
PCL11-B	2 SU	14.0	0.0	0.5	1.5	4

UNIBUS Switch

DT07-xx

Family of UNIBUS switches designed to connect a section of UNIBUS and associated peripherals to one or as many as four PDP-11 and/or VAX-11 processors. Switching may be accomplished manually or under program control to permit dynamic reconfiguration of UNIBUS peripherals for resource sharing or high-availability applications.

The DT07 includes a "watchdog" timer that can be used to sense when the processor owning the switched section has halted or is executing an invalid program; when this occurs, the switched UNIBUS is automatically disconnected from the failing CPU and connected to the backup processor. A separate cabinet is recommended for the BA11-K switched UNIBUS box.

DT07 Order Codes

Option	Order Code
Switched UNIBUS repeater	DT07-AA
Unterminated expansion port	DT07-AB
Radial expansion port	DT07-AC
Two port isolated loop package	DT07-BD
Three port isolated loop package	DT07-BF
Four port isolated loop package	DT07-BJ
Two port remote terminal package	DT07-CD
Three port remote terminal package	DT07-CF
Four port remote terminal package	DT07-CJ
Two port radial package	DT07-DD
Three port radial package	DT07-DF
Four port radial package	DT07-DJ

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DT07	1 Hex Slot	3.5-4.5	0.015	0.05	1 per UNIBUS	N/A

Contact your Digital Sales Representative for assistance in configuring the DT07 switch.

Product Information

Ethernet Communications Servers are small, dedicated computer subsystems that enable cost-effective resource sharing in a local area network. They provide specific communications functions for all hosts attached to the Ethernet, freeing individual hosts from performing those functions themselves.

Digital's Ethernet Communications Servers include the DECnet Router Server, DECnet Router/X.25 Gateway, DECnet/SNA Gateway, and Terminal Server.

All Ethernet Communications Servers require at least one host CPU with Phase IV DECnet software running under the VAX/VMS, RSX-11M, or RSX-11M-PLUS operating systems. The host CPU must be on the same Ethernet to downline load server software and diagnostics into the server. Both server hardware and software are customer installed.

Included in the Ethernet Communications Servers is the following hardware:

- UNIBUS-to-Ethernet communications controller (DEUNA)
- PDP-11/24 processor
- 512 Kbytes of ECC memory (1 Mbyte for the DECnet/SNA Gateway)
- Console/Bootstrap/Terminator (CBT) module
- Protocol Assist Modules (PAMs)
- Line Cards

These components are packaged in a freestanding tabletop unit with self-contained power and cooling. The voltage is switch-selectable (120 V/240 V). The unit is designed with side to side airflow and cannot mount in a cabinet.

Ordering Instructions

-
- | | |
|-------------|--|
| Step One: | Supply the prerequisites. |
| Step Two: | Select the server type. |
| Step Three: | Specify the model number for each component—server hardware, server software, line card cables, country kit. |
| Step Four: | Select the options—add-on line cards, line card cables, and upgrade kit. |
-

Prerequisites

A Communications Server requires an Ethernet LAN including all the physical channel hardware, Phase IV DECnet host installed on the same Ethernet and at least one H4000 transceiver or DELNI (Local Network Interconnect); and a transceiver cable to connect the server to the H4000 or DELNI. See the Networks and Communications Catalogue for ordering information on these prerequisites.

DECnet Router Server

The DECnet Router performs DECnet routing functions that connect DECnet Phase III or Phase IV local or remote hosts to the Ethernet or that connect two independent Ethernets.

DECnet Routers implement Phase IV DECnet adaptive routing algorithms and network management. Through the use of Phase IV DECnet protocols, DECnet computer networks can support up to 1,023 nodes with proper network planning. DECnet Routers offer a cost-effective means of building such networks while off-loading the routing burden from network hosts.

Features and Benefits:

- Hierarchical routing for increased network efficiency.
- Offloads the routing function from Ethernet hosts.
- Allows Phase III nodes to connect to an Ethernet.
- Reduces cabling complexity and increases network reliability.
- Offers full network management capabilities.
- Allows large network support.

Software Order Codes

Option	Order Code
One-line DECnet Router or X.25 Server. Includes one (1) DCSAX-LA line card.	DECSA-EA
DECnet 16 terminal server unit and eight dual-line asynchronous EIA RS-232-C/CCITT V.24 line cards (DCSAX-LC).	DECSA-CA
DECnet 32 terminal server unit and sixteen dual-line asynchronous EIA RS-232-C/CCITT V.24 line cards (DCSAX-LC).	DECSA-DA
Upgrade kit	DCSAX-UA

The DECnet Router Server can be configured with two different line cards:

One-line synchronous EIA RS-232-C/CCITT V.28 line card at speeds up to 19.2K bits per second full duplex	DCSAX-LA
One-line synchronous CCITT V.35 line card at speeds up to 500 Kbits per second full duplex	DCSAX-LB
Two-line asynchronous EIA RS-232-C/CCITT line card at speeds up to 19.2 Kbits per second full duplex	DCSAX-LC

Server Type	License & Warranty	Distribution/ Upgrade Kit	Service Agreements		
			DPMC	BSMC	SMMC
DECnet Router Server QX725 SPD 30.34.00	UZ	HH, HM	9H, 9M	8H, 8M	3H, 3M

Line Card Cables Ordering Information

Line Card Model No.	Cable Model No.	Description
DCSAX-LA	BC17D-xx	Null modem cable (for local connection)
	BC17C-xx	EIA extension cable (for modem connection)
DCSAX-LB	BC17E-xx	V.35 extension cable (for modem connection)

For each line card configured in a DECnet Router Server, a line card cable is required. All line card cables are fully shielded to comply with FCC RFI/EMI specifications.

Caution: The connectors on the Digital-supplied cables are designed to attach to the handle on each line card. For those customers who choose to use other cables with a server, be advised that there is a restriction on the size and construction of the cable connector housing as follows:

- Maximum height of the connector housing is 1.55 centimeters (.610 inch).
- Connectors with housings that extend beyond the face of the connector cannot be used.

Should you elect to use cables that violate the restrictions above, the BC17L cable, a four-foot adapter cable, is available for attaching to the DCSAX-LA line cards with EIA RS-232-C/CCITT V.28 interfaces.

Country Kits

Each DECnet Router Server requires a country kit. The country kit includes a power cord, hardware documentation (English language only), and labels including a front panel display label in the appropriate national language.

Country Kit Order Codes

Option	Order Code
DECnet router server country kit.	DECSK-A*
*Replace the asterisk in the DECnet router server order code with the letter that precedes the desired country/language listed below.	
E - United Kingdom	G - Germany
S - Spain	P - France

Options

The DECnet Router Server can be expanded by adding up to seven additional DCSAX-LA and DCSAX-LB line cards (up to the aggregate throughput limit of 500 Kbits per second). The maximum number of line cards depends on line speed. The actual performance of the line configuration is specified in the Software Product Description (SPD).

For each add-on line card, order a line card cable.

The following represent some valid line configurations:

- Add seven DCSAX-LA cards
- Add seven DCSAX-LB cards at 56 Kbits per second each
- Add eight DCSAX-LB cards at 56 Kbits per second each and discard the DCSAX-LA line card included with the server hardware
- Add two DCSAX-LB cards at 250 Kbits per second each and discard the DCSAX-LA line card included with the server hardware
- Add one DCSAX-LB card at 500 Kbits per second each and discard the DCSAX-LA line card included with the server hardware

DECnet/SNA Gateway

A DECnet/SNA Gateway allows a Digital Ethernet-based DECnet network and an IBM Systems Network Architecture (SNA)-based network to cooperate by connecting the networks.

The DECnet/SNA Gateway links the two vendors' network environments, rather than merely providing single-function communications emulation between two computers. In effect, the DECnet/SNA Gateway makes available to the user the complementary strengths of both the Digital and IBM network environments. The DECnet/SNA Gateway implements SNA protocols and is used with the appropriate VAX/VMS, MicroVMS, RSX-11M, RSX-11M-PLUS Gateway access software. Users can interact with SNA-based subsystems in the following ways: 3270 Terminal Emulation, Remote Job Entry (RJE), or program-to-program communication. Also, IBM/SNA users can exchange documents with VMS users, as well as interactively access VMS systems from their 3270 displays.

Features and Benefits:

- Links the IBM SNA environment to the DECnet environment.
- Provides a multiplicity of SNA functions: 3270 Terminal Emulation, Remote Job Entry, and User Applications Program Interface, DISOSS Document Exchange, Distributed Host Command Facility, and 3287 Printer Emulation.
- Has Gateway Management software for control and troubleshooting.

Server Type	License & Warranty	Distribution/ Upgrade Kit	Service Agreements		
			DPMC	BSMC	SMMC
DECnet Router/ X.25 Gateway Qx727 SPD 30.41.xx	UZ	HH, HM	9H, 9M	8H, 8M	3H, 3M
VAX X.25/X.29 Extension Package Qx728 SPD 26.43.00	UZ	HH, HM	9H, 9M	8H, 8M	3H, 3M

Legend: x is replaced by C for VAX-11/730, D for VAX-11/750, and E for VAX-780.

Software Order Codes

Option	Order Code
One-line DECnet/SNA Gateway for Ethernet. Includes one DCSAX-LA line card.	DECSA-FA

The DECnet/SNA Gateway can be configured with two different line cards:

One-line synchronous EIA RS-232-C/CCITT V.24 line card at speeds up to 9.6 Kbits per second full duplex	DCSAX-LA
One-line synchronous CCITT V.35 line card at speeds up to 56 Kbits per second full duplex	DCSAX-LB

Line Card Cables Ordering Information

Line Card Model No.	Cable Model No.	Description
DCSAX-LA	BC17D-xx	Null modem cable (for local connection)
	BC17C-xx	EIA extension cable (for modem connection)
DCSAX-LB	BC17E-xx	V.35 extension cable (for modem connection)

For each line card configured in a DECnet/SNA Gateway, a line card cable is required. All line card cables are fully shielded to comply with FCC RFI/EMI specifications.

Caution: The connectors on the Digital-supplied cables are designed to attach to the handle on each line card. For those customers who choose to use other cables with a server, be advised that there is a restriction on the size and construction of the cable connector housing as follows:

- Maximum height of the connector housing is 1.55 centimeters (.610 inch).
- Connectors with housings that extend beyond the face of the connector cannot be used.

Should you elect to use cables that violate these restrictions, the BC17L cable, a four-foot adapter cable, is available for attaching to the DCSAX-LA line cards with EIA RS-232-C/CCITT V.28 interfaces.

Country Kits

Each DECnet/SNA Gateway requires a country kit. The country kit includes a power cord, hardware documentation (English language only), and labels including a front panel display label in the appropriate national language.

Country Kit Order Codes

Option	Order Code
DECnet/SNA gateway country kit.	DECSK-A*

*Replace the asterisk in the DECnet/SNA gateway order code with the letter that precedes the desired country/language listed below.

E—United Kingdom	G—Germany	P—France
S—Spain		

Options

Add-on line cards described below reflect physical packaging constraints. The performance of the line cards is specified in the Software Product Description (SPD).

- Add one DCSAX-LA card at 9.6 Kbits per second
- Add one DCSAX-LB card at 56 Kbits and discard the DCSAX-LA line card included with the server hardware

For each add-on line card, order a line card cable as specified.

Communications Servers include the DECnet Router Server, DECnet Router/X.25 Gateway, DECnet/SNA Gateway, and Terminal Server.

DECnet Router/X.25 Gateway

The DECnet Router/X.25 Gateway connects DECnet nodes on an Ethernet to DECnet nodes on an X.25 packet-switched data network (PSDN) using the Data Link Mapping (DLM) capability of the Gateway software. In addition to performing all the functions of the DECnet Router, the DECnet Router/X.25 Gateway also gives those VAX host systems on the Ethernet that have the VAX X.25/X.29 Extension Package (XEP) access to the facilities offered by the PSDN to which the Router/Gateway is connected.

The VAX X.25/X.29 Extension Package provides the following capabilities to VAX hosts on an Ethernet:

- Remote terminals can access the host VAX on the Ethernet by “dialing in” through a network PAD (Packet Assembler/Disassembler). Locally connected terminals (either directly connected to the VAX or logically connected via a Terminal Server) can access other systems connected to the PSDN by “dialing out” via the host VAX PAD provided by the XEP.
- Software routines allow access to the protocol level of X.25 traffic. Access to the packet level of the protocol means that the VAX user can design utility software for task-to-task communication between VAX and the other vendors’ systems.

The DECnet Router/X.25 Gateway can be configured for operation with the following public X.25 data networks:

- Transpac (France)
- Datex-P (Germany)
- PSS (United Kingdom)
- Telepac (Switzerland)

Software Ordering Information

Server Type	License & Warranty	Distribution/ Upgrade Kit	Service Agreements		
			DPMC	BSMC	SMMC
DECnet/SNA Gateway Qx545 SPD 30.15.xx	UZ	HH, HM	9H, 9M	8H, 8M	3H, 3M
DECnet/SNA VMS 3270 TE Qx454	UZ	HG, HM, HY	9G, 9M, 9Y	8G, 8M, 8Y	3G, 3M, 3Y
DECnet/SNA VMS RJE Qx453	UZ	HG, HM, HY	9G, 9M, 9Y	8G, 8M, 8Y	3G, 3M, 3Y
DECnet/SNA VMS AI Qx455	UZ	HG, HM, HY	9G, 9M, 9Y	8G, 8M, 8Y	3G, 3M, 3Y
DECnet/SNA VMS G/W Mgmt Qx452	UZ	HG, HM, HY	9G, 9M, 9Y	8G, 8M, 8Y	3G, 3M, 3Y

Software Order Codes

Option	Order Code
One line DECnet Router/X.25 Gateway. Includes one DCSAX-LA line card.	DECSA-EA

The DECnet Router/X.25 Gateway can be configured with two different line cards. The Software Product Description must be consulted for complete configuration guidelines and limitations.

One-line synchronous EIA RS-232-C/CCITT V.28 line card at speeds up to 19.2 Kbits per second full duplex	DCSAX-LA
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One-line synchronous CCITT V.35 line card at speeds up to 500 Kbits per second full duplex (cannot be used for or with X.25 communications)	DCSAX-LB
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Line Card Cables Ordering Information

Line Card Model No.	Cable Model No.	Description
DCSAX-LA	BC17D-xx	Null modem cable (for local connection)
	BC17C-xx	EIA extension cable (for modem connection)
DCSAX-LB	BC17E-xx	V.35 extension cable (for modem connection)

Note: For each line card configured in a DECnet Router/X.25 Gateway, a line card cable is required. All line card cables are fully shielded to comply with FCC RFI/EMI specifications.

Caution: The connectors on the Digital-supplied cables are designed to attach to the handle on each line card. For those customers who choose to use other cables with a server, be advised that there is a restriction on the size and construction of the cable connector housing as follows:

- Maximum height of the connector housing is 1.55 centimeters (.610 inch).
- Connectors with housings that extend beyond the face of the connector cannot be used.

Should you elect to use cables that violate these restrictions, the BC17L cable, a four-foot adapter cable, is available for attaching to the DCSAX-LA line cards with EIA RS-232-C/V.28 interfaces.

Each DECnet Router/X.25 Gateway requires a country kit. The country kit includes a power cord, hardware documentation (English language only), and labels including a front panel display label in the appropriate national language.

DECnet Router Country Kit Order Codes

Option	Order Code
DECnet Router/X.25 country kit	DECSK-A*

*Replace the asterisk in the DECnet router country kit order code with the letter that precedes the desired country/language listed below.

E - United Kingdom	P - France	G - Germany
S - Spain		

Options

A maximum of two DCSAX-LA line cards can be configured for connection to an X.25 PSDN. The DCSAX-LB line card is only supported for DDCMP routing connections **when concurrent X.25 operation is not required**; this line card cannot be used for X.25 PSDN connections. For each add-on line card, order a line card cable as specified.

Terminal Server

The Terminal Server provides a cost-effective and flexible way to logically connect nonintelligent terminals to hosts in an Ethernet LAN. Each terminal connected to the Terminal Server can access any VAX/VMS or RSX host connected to the same Ethernet. Terminals can access remote DECnet nodes through intervening DECnet Phase IV routing nodes on the same Ethernet. They can also connect to VAX/VMS host systems on Ethernet running the appropriate software access routines and thus access a DECnet Router/X.25 Gateway or DECnet SNA Gateway.

Each Terminal Server connects up to 32 asynchronous terminals at speeds up to 19.2 Kbits per second to local Ethernet hosts that implement the Local Area Transport (LAT) protocol. Note that a host does not have to be running DECnet to communicate with the Terminal Server. However, DECnet-VAX must be running on at least one VAX/VMS host connected to the same Ethernet in order to downline load the Terminal Server.

The function performed by the Terminal Server is similar to that offered by traditional terminal data switches (for example, Gandalf or Micom). The difference is that the Terminal Server handles terminal communications from the terminal to the host over a single Ethernet host interface, while a traditional switch requires multiple terminal line connections. This results in a significant cost per line reduction when using the Terminal Server, especially when host power and packaging expenses are factored into the overall cost of network terminal connection.

In a VAXcluster environment, the Terminal Server adds significantly to maintaining high availability to the cluster. Features such as login load balancing, multiple terminal sessions, and automatic login failover for multi-session terminal connections provide greater user productivity. The Terminal Server thereby increases the synergy that now exists between Digital's leading edge products: Ethernet and VAXclusters.

Features and Benefits:

- Provides virtual terminal access to multiple local hosts on the same Ethernet. This helps to distribute resources cost-effectively throughout the network.
- Off-loads terminal I/O processing from the Ethernet host, thereby reducing CPU overhead.
- The same Terminal Server software will run on either a 16- or 32-line hardware configuration without modification. This provides considerable flexibility in the distribution of terminals throughout the Ethernet LAN.
- Since the Terminal Server provides access to multiple hosts, it can reduce the number of direct terminal connections to individual hosts on the Ethernet with a corresponding reduction in cost per connection.
- Provides multiple levels of security for terminal access to network hosts preventing unauthorized users from accessing network resources.
- Eliminates terminal "blocking" by managing multiple terminal requests logically instead of physically. The LAT software allows the Terminal Server to effectively "multiplex" many terminal access requests over a single outgoing physical line.
- Provides increased reliability and redundancy by allowing terminals logically connected to a failed host to access other hosts on the Ethernet.

Software Ordering Information

Server Type	License & Warranty	Distribution/ Upgrade Kit	Service Agreements		
			DPMC	BSMC	SMMC
Terminal Server Qx726	UZ	HH, HM	9H, 9M	8H, 8M	3H, 3M

Software Order Codes

Option	Order Code
16-line Terminal Server	DECSA-CA
32-line Terminal Server	DECSA-DA

The Terminal Server comes configured with one type of line card.

Two-line asynchronous EIA RS232-C/CCITT V.24 line card with each line at speeds up to 19.2 Kbits per second full duplex DCSAX-LC

The basic hardware DECSA-CA includes eight DCSAX-LC line cards. The DECSA-DA includes sixteen DCSAX-LC line cards.

Line Card Cables Ordering Information

Line Card Model No.	Cable Model No.	Description
DCSAX-LC	BC22D-xx	Null modem cable (for local connection)
	BC22E-xx	EIA extension cable (for modem connection)

Note: For each line card configured in a Terminal Server, a line card cable is required. All line card cables are fully shielded to comply with FCC RFI/EMI specifications.

Caution: The connectors on the Digital-supplied cables are designed to attach to the handle on each line card. For those customers who choose to use other cables with a server, be advised that there is a restriction on the size and construction of the cable connector housing as follows:

- Maximum height of the connector housing is 1.55 centimeters (.610 inch).
- Connectors with housings that extend beyond the face of the connector cannot be used.

Should you elect to use cables that violate the restrictions above, the BC17L cable, a four-foot adapter cable, is available for attaching to the DCSAX-LC line cards with EIA RS232-C/CCITT V.28 interfaces.

Country Kits

Each Terminal Server requires a country kit. The country kit includes a power cord, a hardware documentation (English language only), and labels including a front panel display label in the appropriate national language.

Country Kit Order Codes

Option	Order Code
Terminal server country kit	DECSK-A*
*Replace the asterisk in the Terminal server country kit order code with the letter that precedes the desired country/language listed below.	
E-United Kingdom	G-Germany
S-Spain	P-France

Terminal Server Option Configurations

A sixteen-line Terminal Server can be expanded to a 32-line Terminal Server by purchasing an upgrade kit (DCSAX-UA) and adding up to eight additional line cards (DCSAX-LC) along with line card cables. The upgrade kit includes Protocol Assist Module (PAM) set and a dc power supply to support the additional logic and line cards.

Following is a list of recommended configurations for ordering a Terminal Server for VAXcluster systems.

1xDELNI-AB	Local network interconnect
1xDEUNA-AA	Ethernet-to-UNIBUS communications controller (for one VAX/VMS host system)
1xDELNK-AX	DELNI country kit
2xBNE3B-10	Transceiver cables (for host and terminal server)
1xDECSA-DA	32-line terminal server (also specify software, line card cables and country kits as defined above)
1xDELNI-AB	Local network interconnect (also specify country kits as specified above)
1xDELNK-AX	DELNI country kit
1xDEUNA-AA	Ethernet-to-UNIBUS communications controller
2xBNE3B-10	Tranceiver cables

DECserver 100

The DECserver 100 is a low cost network terminal switch for Ethernet local area networks. Each DECserver 100 can connect up to 8 Digital asynchronous terminals at speeds between 75 bits per second and 19,200 bits per second to one or more nodes on an Ethernet. Additionally, the following capabilities are also supported:

- Split speed (transmit and receive) terminal operation.
- Block mode transfers.
- Automatic line speed detection.
- Digital PC file transfer.
- XON/XOFF handling.

The DECserver 100 implements Local Area Transport (LAT) protocol for communication with service nodes that implement this protocol on the same Ethernet. The interface provides high terminal I/O performance over an Ethernet while reducing host CPU cycles required to handle interrupts. Because of this, under most I/O loading conditions, a significant performance gain may be realized by using the DECserver 100 rather than direct terminal connections.

DECserver 100 software is designed to run on DECserver 100 hardware exclusively. This hardware includes an Ethernet transceiver cable, and eight EIA RS-232-C/CCITT V.24 asynchronous line interfaces for connecting terminals to the unit. It's designed for local terminal use only.

The DECserver 100 supports VT100 Series, VT200 Series, and LA100-type terminal devices as well as Digital devices that run in VT100 compatibility mode (for example, the DECmate II, the Rainbow personal computer, and the Professional 300 series computers).

Prerequisite Hardware

- DECserver 100 hardware.
- All Ethernet physical channel hardware.
- An H4000 Transceiver (or a DELNI) and transceiver cable.

Prerequisite Software

- DECnet-VAX V3.1 (or later) support on one or more DECserver load hosts (on the Ethernet) to downline load server software.

The DECserver 100 supports VAX/VMS V3.6 (or later) service nodes. The LAT service node software is included on the DECserver 100 software distribution media if needed for VMS V3.6. For VMS V4.0 (or later) the VMS LAT software is included in VMS, therefore the software installation procedure will not install the kit version of the LAT service node software.

DECserver 100 Order Code

Option	Order Code
8-line DECserver 100, 240 Vac (supports 8 EIA RS-232 physical terminal connections).	DSRVA-AB

Country Kit Order Codes

Option	Order Code
DECserver 100 Country Kit	DSRVK-A*

*Replace the asterisk in the DECserver 100 Country Kit order code with the letter that precedes the desired country/language listed below.

E-United Kingdom	G-Germany	P-France
S-Spain		

To connect terminals to the DECserver 100, order BC220H null modem cables and BC22E 3-foot adapter cable when connecting to existing null modem cables. Note that at a minimum, the 3-foot adapter cable is required. When ordering cables, be sure to specify the length, for example BC220H-25.

Every DECserver 100 requires a country kit. Each country kit includes a power cord and a hardware manual. Be sure to order the appropriate country kit.

Software Order Codes

Option	Order Code
License option for VAX 11/725 and 11/730	QC925-UZ
License option for VAX 11/750	QD925-UZ
License option for VAX 11/780-series*	QE925-UZ

Materials and Service Options

Distribution and documentation for VAX 11/725 and 11/730	QC925-HG and QC925-HM
Distribution and documentation for VAX 11/750	QD925-HG and QD925-HM
Distribution and documentation for VAX 11/780-series	QE925-HM and QE925-HY
Software revision right-to-copy for VAX 11/725 and 11/730	QC925-HZ
Software revision right-to-copy for VAX 11/750	QD925-HZ
Software revision right-to-copy for VAX 11/780-series	QE925-HZ
Documentation only for VAX 11/725 and 11/730	QC925-GZ
Documentation only for VAX 11/750	QD925-GZ
Documentation only for VAX 11/780-series	QE925-GZ

*For software licensing purposes, a VAX 11/782 is a multiprocessor that is considered a single CPU

H4000

The Ethernet Transceiver (H4000) provides the functional interface between network nodes and the Ethernet coaxial cable. It sends signals over the cable, receives signals from the cable, and detects message collisions that occur.

The H4000 uses a unique tapping mechanism for the physical connection to the cable so that cutting the cable (and interrupting traffic on the network) is not required. The H4000 can be customer-installed using the H4000 Transceiver Installation Tool Kit.

The H4000 Transceiver is used in conjunction with an Ethernet communications controller. A transceiver cable connects the H4000 to an Ethernet communications controller at the host system. The transceiver cables must be ordered separately.

H4000 Order Code

Option	Order Code
Ethernet transceiver	H4000

H4000 Transceiver Installation Tool Kit

Self-installation of an H4000 Transceiver requires the H4000 Transceiver Installation Tool Kit (H4090). The kit comes with or without a cordless, rechargeable, 1/4-inch electric drill (240 volt, 50 Hz charger), cable drilling fixture, braid terminators, hex wrench, insulated drill bits, and H4000 TAP Installation Sheet.

Tool Kit Order Code

Option	Order Code
Ethernet transceiver toolkit	H4090-KB

Local Network Interconnect (DELNI)

The Local Network Interconnect (DELNI) is a low-cost, table-top device with its own power supply. It is a concentrator that allows up to eight Ethernet-compatible devices (not terminals) to be grouped together. Device performance remains constant whether connected to the Ethernet through a DELNI or to an H4000 transceiver or a DECOM transceiver.

The DELNI can be configured three ways: stand-alone, hierarchical stand-alone, and connected. A switch on the DELNI allows selection of either stand-alone or connected mode of operation.

LNI Order Code

Option	Order Code
Local Network Interconnect	DELNI-AB

LNI Country Kit Order Codes

Option	Order Code
LNI country kit	DELNK-A*

*Replace the asterisk in the LNI country kit order code with the letter that precedes the desired country/language listed below.

B - Belgium	D - Denmark	E - United Kingdom
F - Finland	G - Germany	H - Netherlands
I - Italy	K - French-speaking Switzerland	L - German-speaking Switzerland
M - Sweden	N - Norway	P - France
S - Spain		

The Ethernet Repeater (DEREP), a tabletop, stand-alone device, connects multiple segments of Ethernet coaxial cable to extend an Ethernet LAN beyond the 500-meter (1,640-feet) single coaxial cable segment. Each repeater can add a segment of coaxial cable up to 500 meters (1,640 feet) long on which 99 additional (100 total) H4000 Transceivers can be installed. The local repeater is used to connect two coaxial cable segments no more than 100 meters (328 feet) apart, while the remote repeater (fiber-optic) connects two coaxial cable segments up to 1,000 meters (3,280 feet) apart. The repeater retimes, amplifies, and repeats all signals it receives from one coaxial cable segment and passes the signal to the next segment. The Ethernet repeaters cannot be used in Broadband Ethernet networks, or between Baseband and Broadband Ethernets. Repeaters cannot be connected to DELNIs.

Both the local and remote repeaters are connected to the Ethernet via two H4000 Transceivers and two transceiver cables. The remote (fiber-optic) repeater consists of two local repeaters each with a fiber-optic interface board. The fiber-optic cable (BN25B) for the remote repeater must be ordered separately. The fiber-optic interface board is an option that can be installed to upgrade a local repeater to function as half of a remote repeater. The fiber-optic interface boards and the fiber-optic link must be ordered separately through the DECdirect Catalogue.

Local repeaters require one country kit. Remote repeaters require that two country kits and a fiber optic cable be ordered separately. Repeater country kits include power cord and installation manual.

Repeater Order Codes

Option	Order Code
Local Ethernet Repeater	DEREP-AB
Remote Ethernet Repeater	DEREP-RB

Local Repeater Country Kit Order Codes

Option	Order Code
Repeater country kit	DEREK-A*

*Replace the asterisk in the local repeater country kit order code with the letter that precedes the desired country/language listed below.

B - Belgium	D - Denmark	E - United Kingdom
F - Finland	G - Germany	H - Netherlands
I - Italy	K - French-speaking Switzerland	L - German-speaking Switzerland
M - Sweden	N - Norway	P - France
S - Spain		

Remote Repeater Country Kit Order Codes

Option	Order Code
Remote repeater country kits	DEREK-R*

*Replace the asterisk in the remote repeater country kit order code with the letter that precedes the desired country/language listed below.

B - Belgium	D - Denmark	E - United Kingdom
F - Finland	G - Germany	H - Netherlands
I - Italy	K - French-speaking Switzerland	L - German-speaking Switzerland
M - Sweden	N - Norway	P - France
S - Spain		

Ethernet on broadband is an extension of what Digital has done with Ethernet on baseband, the first form of media available for Ethernet. Baseband and broadband both provide the same capabilities, a high speed (10-million-bits-per-second), peer-to-peer communications link between computers and other intelligent devices for file transfers and high-resolution graphics displays, and for transmitting text, electronic mail, and facsimile data. The Broadband Ethernet Transceiver (DECOM) uses the same controllers and DECnet Phase IV software as baseband. In addition, the broadband transceiver is also used in conjunction with the DELNI, as well as the same routers, gateways, terminal servers, and communications servers, as for Baseband Ethernet networks. Repeaters, however, cannot be used in broadband networks, or between Baseband and Broadband Ethernets.

The major characteristics that distinguish Ethernet on broadband from Ethernet on baseband are:

Baseband

- Packets are transmitted by an H4000 transceiver
- Baseband Ethernet is the only channel on the cable
- Network cable is designed to Ethernet specifications
- Transceiver serves as the tap and transceiver cable serves as the drop cable

Broadband

- Packets are transmitted by a Broadband Ethernet Transceiver
- Broadband Ethernet can share the cable with many other independent channels, such as video, data, and voice
- Network cable is the same as for cable TV
- Tap and drop cable are also the same as for cable TV

Digital's Broadband Ethernet products implement an Ethernet channel for both single and dual cable broadband LANs. As previously noted, almost all of the Digital networking products used with the baseband technology, are also compatible with broadband. These include:

- DECnet Phase IV for VMS, RSX, and P/OS operating systems
- UNIBUS, Q-bus, and Professional 350-bus Ethernet controllers, (DEUNA, DEQNA, and DECNA)
- Local Network Interconnects (DELNI)
- Communications servers (Routers, Terminal Servers, and Gateways)

Digital offers a complete set of Ethernet hardware and software products that are baseband and broadband compatible. There are two products that have been specifically created for the broadband environment. These are the Broadband Ethernet Transceiver (DECOM) and the Broadband Ethernet Frequency Translator (DEFTR). Both devices can be used with the Digital networking products originally developed for Baseband Ethernet LANs (with the exception of the Ethernet Repeater (DEREP)).

Broadband Ethernet Transceiver (DECOM)

The Broadband Ethernet Transceiver is both the physical and electrical interface to the broadband coaxial cable. The transceiver transmits signals to and receives signals from systems connected to it and detects message collisions. The broadband equivalent of the H4000 (Baseband) Transceiver, DECOM, uses the same transceiver cable as the H4000. The DECOM can be conveniently mounted on a shelf or placed on a table-top. Because there are two types of Broadband Networks, single cable and dual cable, Digital has created two versions of the Broadband Transceiver. The single-cable transceiver (DECOM-BA) transmits at 54 to 72 megahertz and receives at 210.25 to 228.25 megahertz. This transceiver requires a Frequency Translator (DEFTR) at the headend of the network to convert the Broadband Ethernet signals from their transmit to their receive frequencies.

The dual-cable transceiver (DECOM-AA) transmits and receives the Ethernet signals at the same frequencies, from 54 to 72 megahertz. For this version of the transceiver, a Frequency Translator (DEFTR) is not required at the network headend.

Features and Benefits

- Redundant protective circuitry makes the transceiver a reliable physical channel device. Failures are confined to a single transceiver, preventing the entire network from going down.
- Internal self-test and loop-back capabilities allow speedy diagnosis of problems and easy fault isolation.
- Diagnostic indicator lights help to verify correct configurations, check out equipment, and solve any faults. Customers can install transceivers themselves.
- Adjustments at installation are unnecessary. The design of the transceiver allows it to operate successfully in a wide range of cable environments.
- The transceiver does not interfere with other channels operating on the network because its transmissions are well-contained within its specific bandwidth.
- Because collisions are seen by all receiving transceivers, the Ethernet channel can be monitored at any Ethernet node.
- Transceiver can be conveniently located and easily mounted on a shelf or table-top.

Transceiver cable is not supplied with the DECOM Transceiver and must be ordered separately. Both the H4000 Transceiver and DECOM use the same transceiver cables (see the appropriate product description). The U.S. version of the DECOM Transceiver does not require a country kit. The U.S. version includes the required power cord and user manual. The non-U.S. version includes the user manual (in English) and requires one country kit. Order the appropriate country kit for the power cord.

Broadband Ethernet Transceiver and Country Kit Order Codes

Option	Order Code
Broadband Ethernet transceiver (dual cable).	DECOM-AB
Broadband Ethernet transceiver (single cable).	DECOM-BB
Powercord and user manual country kit.	DEBBK-A*

*Replace the asterisk in the power cord and user manual country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Broadband Ethernet Frequency Translator (DEFTR)

The Broadband Ethernet Frequency Translator (DEFTR) is located at the network headend making bidirectional communication on the Ethernet channel possible in single-cable broadband LANs. The DEFTR receives all Ethernet signals transmitted by systems connected to the network by DECOM, translates them, and retransmits them at the appropriate DECOM receive frequencies.

The Frequency Translator has a highly reliable design for consistent availability of the Ethernet channel, and front panel monitors that help you isolate and diagnose both headend and transceiver problems. Customers have the option of configuring two translators in parallel when redundancy is required.

The U.S. version of the Broadband Ethernet Frequency Translator (DEFTR) does not require a country order kit. The U.S. version includes the required power cord and the user manual. The non-U.S. version of the DEFTR includes the user manual (in English) and requires one country kit. Order the appropriate country kit for the power cord.

Broadband Ethernet Frequency Translator Order Codes

Option	Order Code
Broadband Ethernet frequency translator.	DEFTR-AB
Frequency translator country kit.	DEBBK-A*

*Replace the asterisk in the frequency translator country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Industrial Q-BUS I/O Options

IxV11 Family

The IxV11 family of modules is designed for Realtime applications where in-built signal conditioning and isolation is needed. At present seven different modules are available: an A/D converter, a multiplexor for the A/D converter, a D/A converter, an optically-isolated digital input module, two digital output modules and a 5-channel high-speed timer/cunter module.

The IxV11 modules can be used in any LSI-11 (Q18/222-bus) configuration. A device driver is available under RSX-11M/S, RSX-11M-PLUS and Micro/RSX.

IxV11 Order Codes

Option	Order Code
16-bit opto-coupler isolated digital input module.	IDV11-A
16-bit opto-coupler isolated digital output module.	IDV11-B
16-bit output module	IDV11-C
Five-channel counter module.	IDV11-D
Isolated multi-channel A/D converter. 4 channel flying capacitor true differential isolated channels, 12 channel solid-state multiplexed unisolated channels.	IAV11-A
16 channel flying capacitor multiplexer board for IAV11-A. As many as seven IAV11-C can be connected to one IAV11-A for a possible maximum of 128 channels.	IAV11-C
Four channel group-isolated D/A converter.	IAV11-B
Compact screw terminal assembly.	H3031
Software	
IXV1 RSX-11M/S/PLUS software driver.	Q7194

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn
		+ 5V	+ 12V	AC
IDV11-A	1 Dual Slot	0.72	0.0	1.0
IDV11-B	1 Dual Slot	0.44	0.0	1.0
IDV11-C	1 Dual Slot	0.76	0.0	1.0
IDV11-D	1 Dual Slot	0.80	0.0	1.0
IAV11-A	1 Dual Slot	1.30	0.0	1.0
IAV11-B	1 Dual Slot	1.50	0.0	1.0
IAV11-C	1 Dual Slot	0.20	0.0	0.0

Q-bus Digital I/O Options

The DRV11 models feature a general purpose program-controlled parallel line interface unit. They permit program-controlled data transfers at rates as high as 40 Kwords per second. **Note:** External cables are not included. The BC04Z or BC07D are recommended.

DRV11 Order Codes

Order Code	Option
For use with a MicroPDP-11 or a MicroVAX II BA23 box.	DRV11-LA
For use with a PDP-11/23-S BA11-M box or a MicroVAX II BA123 box.	DRV11-LB
For use with a PDP-11/23-PLUS H349 panel.	DRV11-LC

DRV1B

The *DRV1B* models feature a general purpose direct memory access (DMA) parallel line interface unit. They permit data transfers at rates as high as 250 K words per second in a single cycle mode and up to 500K words per second in a burst mode. **Note:** External cables are not included. BC04Z or BC07D are recommended. DMA capability limited to the first 256 KBytes.

DRV1B Order Codes

Option	Order Code
For use with a MicroPDP-11 or a MicroVAX II BA23 box.	DRV1B-KA
For use with a PDP-11/23-S BA11-M box or a MicroVAX II BA123 box.	DRV1B-KB
For use with a PDP-11/23-PLUS H349 panel.	DRV1B-KC
The DRV11-WA is a dual board which is functionally identical to the DRV11-B. For use on Q22-BUS systems.	DRV11-WA

DRV1J

The *DRV1J* models feature a general purpose program-controlled parallel line interface. They contain 64 bidirectional input/output lines configured as four 16-bit ports and are bit interruptable on as many as 16 lines. Interrupt vectors may have fixed or rotating priorities. **Note:** External cables are not included.

DRV1J Order Codes

Option	Order Code
For use with a MicroPDP-11 or a MicroVAX II BA23 box.	DRV1J-KA
For use with a PDP-11/23-S BA11-M or a MicroVAX II BA123 box.	DRV1J-KB
For use with a PDP-11/23-PLUS H349 panel.	DRV1J-KC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
DRV11-BP	1 Quad Slot	1.9	0.0	9.5	3.3	1.1	A
DRV11-J	1 Dual Slot	1.8	0.0	9.0	2.0	1.0	A
DRV11-L	1 Dual Slot	0.9	0.0	4.5	2.8	1.0	A
DRV11-WA	1 Dual Slot	1.8	0.0	9.0	2.0	1.0	A

UNIBUS Digital I/O Options

DR11C

The *DR11C* models are a general purpose digital interface that permits bi-directional 16-bit parallel transfers between the user's device and the UNIBUS. They include all necessary interrupt, address, control signals, cables and connectors. The cable for connection to the user's device is not included. The recommended cable is the BC08R.

DR11C Order Codes

Option	Order Code
For use with shielded UNIBUS CPU cabinets.	DR11C-LD
For use with VAX 11/750 and VAX 11/730 UNIBUS CPU cabinets.	DR11C-LE
For use with VAX 11/780 and VAX 11/785 UNIBUS CPU cabinets.	DR11C-LH

The *DR11W* models are a general purpose direct memory access (DMA) controller which interfaces user devices to the PDP-11 UNIBUS. In addition, the *DR11W*s provide a half-duplex interprocessor link between UNIBUS, VAX, and Q-bus systems when connected to another *DR11W* (for UNIBUS or VAX) or *DRV11-B* (for Q-bus). Features include: transfer of as many as to 64K 16-bit words at a rate as high as 500K words per second; word or byte transfers; and burst data transfers. **Note:** BC06R-xx or equivalent cables are required for interconnect, the maximum length being 15.2 meters (50 feet). Cabinet kit not required. Required cables are standard.

DR11W Order Codes

Option	Order Code
For use with shielded UNIBUS CPU cabinets.	DR11W-LD
For use with VAX 11/750 and VAX 11/730 UNIBUS CPU cabinets.	DR11W-LE
For use with VAX 11/780 and VAX 11/785 UNIBUS CPU cabinets.	DR11W-LH

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DR11-C	1 Quad Slot	1.5	0.0	0.0	1.0	N/A
DR11-W	1 Hex Slot	3.7	0.0	0.0	1.0	1

IEEE Interfaces

IEEx11

The *IEU11*, and *IEQ11* are interfaces which conform to the IEC 625-1 IEEE Std. 488-1978 test equipment. The *IEU11* is for UNIBUS based systems while the *IEQ11* is designed for Q-bus based systems.

The *IEU11* and *IEQ11* incorporate two independent IEC/IEEE-448 controllers. Each controller is capable of supporting up to 15 instruments, including the controller itself. This gives the user the ability to connect up to 28 instruments to a single module.

The *IEU11* and *IEQ11* are bit-parallel byte-serial controllers that can perform transfers in either program interrupt or direct memory access (DMA) mode. DMA is standard with the *IEU11* and the *IEQ11*. Each independent bus provides system controller, controller-in-charge, talker, and listener capabilities. Termination of data transfers are by E.O.I. or byte count. The *IEU11* and the *IEQ11* also offer termination of data transfers by match characters.

IEEx11 Order Codes

Option	Order Code
Dual bit-parallel, UNIBUS DMA controller for IEC-625 instruments. Includes interface module, test cable, bulkhead/cable assembly for connecting to one of the two IEC-625 controllers on the module. See the cable chart below.	IEU11-AA
Dual bit-parallel, UNIBUS DMA controller for IEEE-488 instruments. Includes interface module, test cable, bulkhead/cable assembly for connecting to one of the two IEEE-488 controllers on the module. See the cable chart below.	IEU11-AB

Option	Order Code
Dual bit-parallel byte-serial DMA Q-bus controller for IEC-625 instruments. Includes interface module, test cable, bulkhead/cable assembly for connecting to one IEC-625 controller.	IEQ11-AA
Dual bit-parallel, byte-serial DMA bus interface controller for Q-bus IEEE-488 instruments. Includes interface module, test cable, bulkhead/cable assembly for connecting to one IEEE-488 controller.	IEQ11-AB

Software Order Codes

Option	Order Code
RT-11 handler, sources (IEU11 or IEQ11)	QJS36-X*
RT-11 handler, license to copy	QJS36-DZ
RSX-11M/M-PLUS and Micro-RSX driver, sources (IEU11 or IEQ11)	QJS37-X*
RSX-11M/M-PLUS and Micro-RSX driver, license to copy	QJS37-DZ
VMS/VAX-11/730 software driver	QC519-X*
VMS/VAX-11/730 software driver, license to copy	QC519-DZ
VMS/VAX-11/750 software driver	QD519-X*
VMS/VAX-11/780 software driver, license to copy	QE519-DZ
VMS/VAX-11/780 software driver	QE519-X*
VMS/VAX-11/780 software driver, license to copy	QE519-DZ
VMS/VAX-11/730 driver, license to copy	QC517-DZ

Cable Information

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
IEC11-AB	1 Hex Slot	2.5	0.0	0.0	1.0	1
IEC11-BA	1 Hex Slot	2.5	0.0	0.0	1.0	1
IEC11-CA	2 Hex Slots	5.0	0.0	0.0	1.0	1
IEV11-AB	1 Hex Slot	3.5	0.0	0.0	1.0	1

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V		AC	DC	
IEQ11	1 Quad Slot	3.5	0.0	17.5	2.0	1.0	C

Realtime Clock Order Codes

Option	Order Code
UNIBUS programmable realtime clock. Program-selectable interrupts of 100 kHz, 10 kHz, line frequency or external signal, counted down by 16-bit counters with automatic reload.	KW11-P
Q-bus 16-bit programmable realtime clock. Four programmable modes and five crystal-controlled frequencies are user-selectable. Refer to the Microcomputer Interfaces Handbook .	KWV11-C

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
KW11-P	1 Quad Slot	1.0	0.0	0.0	1.0	N/A
KWV11-C	1 Dual Slot	2.0	0.0	0.0	1.0	N/A

GS03 Series

The *GS03 Series* is a family of peripheral devices and communication line switches for use in dual computer systems. It allows quick and easy switching, and can accommodate different combinations of peripheral and serial devices (both synchronous and asynchronous). The GS03s also offer two ways to control device switching, including manual control of switches on their back panels, and automatic control switching. They are 5.25-inch high rack units with integral power supply and backplane. As many as two switching options can be fitted onto one rack. Each switching option includes the cables necessary to connect a GS03 to the associated computer interface. All cabling is machine-built for high reliability.

OPTION	DESCRIPTION	MOUNTING
GS03-AB	Basic rack for up to eight modules	
GS03-AE	Kit to control GS03 from two KW11-W watchdog timers for automatic switch control.	Uses dedicated slot in GS03-AB
GS03-WD	Serial line watchdog for automatic switch; controls up to eight racks. Uses one serial line from DZ11 or DMF32 (cable kits are included)	Uses dedicated slot in GS03-AB
GS03D-LV	Switch option for DL11-J	1½ rack
GS03D-U1	Switch option for two DUP11 (individual switching)	1½ rack
GS03M-FB	Switch option for two DMF32 (switches the serial lines only)	1½ rack
GS03D-ZA	Switch option for eight EIA modem lines to DZ11A/B (individual switching)	1 rack
GS03D-ZH	Switch option for 16,20-mA lines to DZ11 (switched in groups of four)	1½ rack
GS03D-ZJ	Switch option for 16 EIA (data only) lines to DZ11 (switched in groups of four)	1½ rack
GS03D-MA	Switching option for 2 EIA/CCITT channels RS232C, RS423, RS422, V.35(DMP11, DMR11, KMS11-P, DMV11, KMW11)	1½ rack
GS03K-SB	Switching option for the KMS11-BD (switches eight lines individually)	1 rack
GS03L-PT	Switch option for LP11 including interface	1½ rack
GS03L-SL	Switch option for LSP25/26 line printer including interface.	1½ rack

High Performance Double-Buffered Parallel DMA Interfaces

DRx11 Series

The *DRx11 Series* alternate buffered, general purpose interfaces including DRQ11, DRU11 and DRE11 are used to transfer streams of 16-bit parallel data between central processors, or between a processor and an external device.

The three interfaces employ Direct Memory Access (DMA) to maximize data throughput by reducing performance-draining processor interrupts and is the fastest means of transferring data to and from memory. Transfers can be made in word, single block, or multiple block mode. Each buffer consists of a separate area (up to 64K words) defined within the main memory. Each interface allows local operation at distances up to 15 metres between the host computer and the external device (or second CPU).

All of these option can be used as an inter-processor buffer, i.e., Q-bus connection to UNIBUS machine, etc.

DRX11 Order Codes

Option	Order Code
Interface which is TTL compatible for local operation up to 15 metres from host LSI-11 computer (Q-bus).	DRQ11-CA
Interface which is TTL compatible for local operation up to 15 metres from host PDP-11 computer.	DRU11-CA
Interface which is TTL compatible for local operation up to 15 metres from host VAX computer.	DRE11-CA
Interface incorporating differential signal conditioning module for operation up to 300 metres from host computer (using twisted pair cable).	DRQ11-CB DRU11-CB DRE11-CB
Interface incorporating differential signal conditioning module with optically isolated receivers and parity check for operation up to 300 metres from host computer.	DRQ11-CE DRU11-CE DRE11-CE

Software Order Codes

Option	Order Code
VMS/VAX-11/730 Software driver	QCS36-X*
VMS/VAX-11/730 Software driver, license to copy.	QCS36-DZ
VMS/VAX-11/750 Software driver.	QDS36-X*
VMS/VAX-11/750 Software driver, license to copy.	QDS36-DZ
VMS/VAX-11/780 Software driver.	QES36-X*
VMS/VAX-11/780 Software driver, license to copy.	QES36-DZ
RSX-11M/S/PLUS/Micro RSX Software driver	QJS33-X*
RSX-11M/S/PLUS/Micro RSX Software driver, license to copy.	QJS33-DZ

*Designates media.

ADF01-B High Speed Analog-To-Digital Converter

The ADF01 is a high speed A/D converter used with the DRU11-C, DRQ11-C, or DRE11-C parallel DMA interfaces, which provides conversion rates up to 300 kHz. The option contains an input multiplexer capable of 16 single-ended or eight differential inputs, a 12-bit A/D converter, on-board real-time clock, a user programmable control table, a programmable gain amplifier, and one digital-to-analog output channel. Cables are provided to connect to the DRX11-CA option. Software support is provided by the DRX11 drivers, plus a library of FORTRAN subroutines to facilitate user programming.

ADF01 Order Codes

Option	Order Code
12-bit A/D converter.	
Prerequisite: DRQ11-CA, DRU11-CA or DRE11-CA interface.	ADF01-B

AAF01-B High Speed Digital-to-Analog Converter

The AAF01A is a high speed D/A converter used in conjunction with a DRQ11-CA, DRU11-CA or DRE11-CA parallel DMA interface. It allows digital data to be converted to analog output signals at speeds up to 300kHz.

The option provides as many as 16 single encoded analog output channels, a 12-bit D/A converter, an on-board clock generator, a user programmable control table and output protection.

Cables are provided for connection to the DRX11-CA option. Software support is provided by the DRX11 drivers plus a library of FORTRAN subroutines.

AAF01A Order Codes

Option	Order Code
12-bit D/A converter.	
Prerequisite: DRQ11-CA, DRU11-CA, or DRE11-CA interface.	AAF01-A

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
DRS11-A	1 Quad Slot	2.5	0.0	0.0	1.0	2
DRS11-B	1 Quad Slot	2.5	0.0	0.0	1.0	2
DSS11-A	1 Quad Slot	1.6	0.0	0.0	1.0	2
DSS11-B	1 Quad Slot	1.6	0.0	0.0	1.0	2

DRS11/DSS11

The DRS11/DSS11 digital input/output devices provide UNIBUS computers with efficient monitoring and control functions useful for a variety of industrial and scientific applications. Specific features include monitoring operator panels, controlling relays and indicator lights, scanning limit switches and unlocking doors.

The output module (DRS11) provides 48 buffered outputs with one interrupt.

The input module (DSS11) provides 48 optically isolated inputs with one interrupt input.

Any mixture of DRS11 and/or DSS11 modules may be mounted in a UNIBUS system provided that the total does not exceed 16 and subject to the normal constraints of mounting space, bus loads and 5 volt power.

DRS11/DSS11 Order Codes

Option	Order Code
Digital output device (TTL). Includes one RC filtered interrupt input, two 3-meter (10-foot) flat ribbon cables (50 conductors) terminated into 50 pin BERG connectors for connection to field output signals.	DRS11-A
Digital output device with open collector drivers. Includes one RC filtered interrupt input, two 3-meter (10-foot) flat ribbon cables (50 conductors) terminated into 50 pin BERG connectors for connection to field output signals.	DRS11-B
Optically isolated DC drivers with open collectors; prerequisite is DRS11-B.	DRS11-XA
Digital input device (TTL). Includes two 3-meter (10-foot) ribbon cables (50 conductors) terminated into 50 pin BERG connectors for connection to field input signals.	DSS11-A
Digital input device. Includes two 3-meter (10-foot) ribbon cables (50 conductors) terminated into 50 pin BERG connectors for connection to field input signals.	DSS11-B
Contact sense input. Prerequisite is DSS11-A.	DSS11-XA
48 bit screw terminal panel.	DSP11-A

Software included in RSX operating system.

Option Mounting Requirements

Option	Output Voltage Off State	Output Voltage On State	Isolation Voltage	Input Voltage
DRS11-A	TTL	TTL	N/A	N/A
DRS11-B	30 VDC	7 VDC/4mA	N/A	N/A
DRS11-XA	50 VDC	1 VDC/75mA	500 VDC	N/A
DSS11-A	N/A	N/A	500 VDC	4-7 VDC
DSS11-B	N/A	N/A	500 VDC	24 VDC
DSS11-XA	N/A	N/A	N/A	24 VDC

DCT11

Digital's microprocessing chips access Digital operating systems, languages and third-party application software. This flexible PDP-11 chip architecture insures high-quality performance from all of Digital's microprocessor-based products. Software licenses for use with a variety of PDP-11 operating systems may be ordered with the microprocessors.

DCT11 Order Codes

Option	Order Code
The T-11 is a single chip microprocessor in a 40-pin dual-in-line ceramic package. It features a PDP-11 compatible instruction set, supports industry standard peripheral chips, and can operate at a maximum clock rate of 7.5 MHz. This powerful microprocessor fully supports static and dynamic memories, and incorporates DMA support. It also supports an internal and external interrupt structure, and uses a time multiplexed address/data bus and a time multiplexed address/interrupt bus. A programmable mode register loaded during power-up can adapt the MICRO/T-11 to a wide variety of applications.	DCT11-AA
A 5 MHz version of the DCT11-AA with the same functionality.	DCT11-AB
The J-11 is a CMOS microprocessor in a 60-pin package that includes 16-bit I/O, a 32-bit internal data path, and addressing capability up to 4 MBytes of memory. It operates at a maximum clock rate of 15 MHz. The J-11 implements the full PDP-11 instruction set, including EIS and Floating Point instructions, and supports 4 levels of hardware interrupt, multiprocessing, co-processing, cache control and fault diagnosis. It supports RT-11, MicroPower/Pascal, RSX-11M, RSX-11M-PLUS, and RSTS/E operating systems.	DCJ11-AC

Software Order Codes

Option	Order Code
PDP-11 Operating System General License with Warranty. Valid for DCT11 only. Note: Although the QJB36-DZ license for the T-11 allows use of any PDP-11 operating system, the T-11 hardware may be used with RT-11 and RSX only.	QJB36-DZ
PDP-11 Operating System General License. Valid for DCJ11 only.	QJB43-DZ

Microprocessor Support Chips

Digital's microprocessors interface easily to industry standard peripheral chips. DLART is a Digital-compatible serial interface chip that provides maximum compatibility with existing software.

Microprocessor Support Chip Order Codes

Option	Order Code
The DLART is a DL-compatible, asynchronous receiver/transmitter designed for data communications with Digital's microprocessors. The DLART is used as a peripheral device and is programmed by the CPU to operate in 8-bit or 16-bit mode with asynchronous baud rates varying from 300 b/s to 38.4 KBytes/s. It has an internal baud rate control that reduces support logic and provides four realtime interrupt outputs to support dynamic memory refresh for realtime system applications including the FALCON-PLUS (SBC-11/21 PLUS). Those applications use a T-11 to communicate with DLARTs. It also features one-stop bit, 40-pin DIP package, single +5 V supply, and single TTL clock.	DC319-AA
Program Control Bus interface chip kit. It includes one DC003 interrupt chip, one DC004 protocol chip, and four DC005 transiever/address decoder/vector select chips.	DCK11-AA
DMA bus interface chip kit. It includes the following nine chips: one DC003 interrupt chip, one DC004 protocol chip, four DC005 transeiver/address decoder/vector select chips, two word count/bus address chips, and one DC010 DMA control chip.	DCK11-AB

Eurocard Q-Bus Modules

EURO-Q is a Digital's family of Q-Bus processors, memory and multi-function board options in EUROCARD format.

Eurocard Order Codes	Option	Order Code
	LSI-11/23 on Eurocard format, 4 megabyte addressing. Suited for complex real time multiuser, multitasking applications using a wide variety of field proven operating systems, layered products and high level languages.	KDE11-AA
	256KB RAM on Eurocard format. It uses 64K × 1MOS RAM chips and takes advantage of the LSI-11/23's 22-bit addressing capability. Full parity functionality is totally self contained on the board and include jumpers to configure memory space and for battery back-up.	MSE11-LK
	Multi-function module, 32KB RAM, 2 serial lines on Eurocard format. Dynamic RAM chips give it a total capacity of 32 Kbytes and refresh electronics are provided on the module. ROM may be used either for storage of the application program or of a bootstrap program. The MXE11 has two serial line interfaces and a 60 Hz crystal clock.	MXE11-AC
	FALCON-PLUS SBC on Eurocard format.	KXE-AB
	EPROM socket module on Eurocard format.	MRE11-D

Single Board Processors

Most Q-bus processors are available on a compact, dual-height 13.3 × 22.8 cm (5.25 × 8.97 in) board. Their 16-bit architecture allows easy programming, greater I/O throughput, and more flexibility.

Single Board Processor Order Codes

Option	Order Code
PDP-11/23 with Memory Management Unit (MMU). This 16-bit dual-height central processor features 4 MBytes addressing, four-level vectored interrupts for fast response without device polling, and 87 standard instructions including EIS. The MMU extends the physical address range up to 4 MBytes, and divides large segments of memory into smaller segments. The MMU protects users by enabling them to control and restrict access to a memory segment. Further, it allows the processor to operate in either a kernel or user mode. In kernel mode, the operating system and programs control and execute all instructions. In user mode, programs are prohibited from performing the instructions that could modify the kernel program, halt the computer, or access memory space reserved to the kernel or other users.	KDF11-AA
PDP-11/23 single-board (without MMU), 16-bit central processing unit. This dual-height module features 64-KBytes addressing, four-level vectored interrupts for fast response without device polling, 87 standard PDP-11 instructions including EIS, and 46 optional floating point instructions.	KDF11-AC
Upgrade option. KDF11-BA with bootstrap ROM for the MicroPDP-11.	KDF11-BE
PDP-11/23-PLUS CPU board includes all features of the KDF11-AA plus two serial lines, diagnostics, bootstrap ROM, and program-controlled line clock. For use with BA11 box (includes selectable baud switch).	KDF1B-KA
PDP-11/23-PLUS CPU board includes all features of the KDF11-AA plus two serial lines, diagnostics, bootstrap ROM, and program-controlled line clock. For use with BA23 box (includes selectable baud switch).	KDF1B-KB
PDP-11/23-PLUS CPU board includes all features of the KDF11-AA plus two serial lines, diagnostics, bootstrap ROM, and program-controlled line clock. For use with H349 panel (includes selectable baud switch).	KDF1B-KC
PDP-11/23-PLUS CPU board includes all features of the KDF11-AA plus two serial lines, diagnostics, bootstrap ROM, and program-controlled line clock. For use with BA11-M box (does not include selectable baud switch).	KDF2B-KA
KDJ11-AA high performance PDP-11 processor with 8-KBytes cache memory, floating point, memory management, and system registers. It includes Q-bus 18- or 22-bit addressing, four jumper selectable power-up options, and on-board diagnostics with four microdiagnostic LEDs. A Floating Point Unit instructs arithmetic, logical and conversion operations, and the MMU allows the processor to operate in kernel, supervisory, or user processor mode.	KDJ11-AA

The system registers perform these functions:

Cache Control—operates cache memory.

Hit/Miss—records the status of the most recent cache accesses.

Program Interrupt Request (PIRQ)—permits software interrupts.

CPU Error—identifies the source of any trap or abort.

Memory System Error—identifies cache or memory parity errors.

Line Time Clock—permits the software to control the line time clock.

Maintenance—lets the software determine the power of options selected.

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
KDF11-AA	1 Dual Slot	2.0	0.2	10.24	2.0	1.0
KDF11-BA	1 Quad Slot	4.5	0.3	26.10	2.0	1.0
KDF11-BE	1 Quad Slot	4.5	0.3	26.10	2.0	1.0
KDJ11-AA	1 Dual Slot	4.0	0.0	20.00	2.0	1.0

Ordering Information

Single Board Computers

KXT11 Order Codes

Option	Order Code
SBC-11/21 FALCON single-board, 16-bit central processor unit features 4 Kbytes of static RAM; 64 Kbytes of direct addressing capability; Q-bus interface; PDP-11 base-level instruction set; 50, 60, or 800 Hz realtime clock; 24-line parallel I/O; two asynchronous serial I/O ports; four 28-pin memory sockets for as many as 4 Kbytes of additional RAM and 16 Kbytes of ROM, or an extra 32 Kbytes of ROM.	KXT11-AA
SBC-11/21 FALCON-PLUS single-board, 16-bit central processor. Its features include 16 Kbytes of static RAM, 64 Kbytes of direct addressing capability, Q-bus interface, PDP-11 base-level instruction set, and 50, 60, or 800 Hz realtime clock. The KXT11-AB also includes 24-line parallel I/O, two asynchronous serial I/O ports, four 28-pin memory sockets for up to 16 Kbytes of additional RAM and 16 KB of ROM, or an extra 32 Kbytes of RAM or 32 Kbytes of ROM.	KXT11-AB

Option	Order Code
<p>The KXT11-CA is a single-board, 16-bit central processor unit. It features Q-bus compatibility, PDP-11 base-level instruction set, 32 KB of static RAM, and two 28-pin sockets for user ROM or static RAM. The KXT11-CA also includes 20-line parallel I/O, two channel DMA controllers, three programmable interval timers, system line time clock, and on-board diagnostic with LED indicators. It is a quad-height module with three programmable serial line units: asynchronous with baud rate from 300 to 38.4 kbaud, synchronous/asynchronous serial, and one synchronous/asynchronous modem control.</p> <p>The KXT11-CA single-board computer operates in two modes. It can be used as a single-board computer or as a peripheral processor. As a peripheral processor, up to 14 KXT11-CAs may be configured on a single Q-bus with a host processor such as a KDJ11 or KDF11.</p>	KXT11-CA

Software Order Codes

Option	Order Code
PDP-11 Operating System General License. Valid for KD11 and KDF11 CPU boards only.	QJB46-DZ
A utility that can load binary files into the CPU of a KXT11 running RT or RSX, allows the execution of a program, and aids debugging.	KXT11-C

KXT11-C Toolkits Order Codes

Option	Order Code
For use with RT-11 operating system.	QJV51-DZ
For use with RSX-11M and RSX-11M-PLUS operating systems.	QJV52-DZ

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
KXT11-AA	1 Dual Slot	2.8	1.1	27.2	1.7	1.0
KXT11-AB	1 Dual Slot	2.8	1.1	27.2	1.7	1.0
KXT11-CA	1 Quad Slot	5.0	0.2	27.4	2.0	1.0

Processor Options

The Q-bus processors offer single- and double-precision floating point options, the Commercial Instruction Set, and Extended and Floating point Instruction Sets (EIS/FIS).

Processor Option Order Codes

Option	Order Code
Single- and double-precision floating point option for use with the KDF11-AA. The KEF11-AA performs hardware operations on 32-bit and 64-bit floating point numbers, provides up to 17 digits of precision as well as integer to floating point conversions, and has 40-pin DIP IC. The KEF11-AA mounts on the KDF11 CPU board and requires a KTF11.	KEF11-AA
Commercial Instruction Set (CIS). Implements a set of 17 commercial instructions on a variety of data types, including character strings, packed decimal, and numeric formats. The KEF11-BB mounts on the CPU board.	KEF11-BB
The FPF11 performs hardware operations on 32-bit and 64-bit floating point numbers, provides up to 17 digits of precision as well as integer to floating point conversions, and executes instructions approximately six times faster than the KEF11-AA. It is a single- and double-precision floating point option for use with the KDF11-A and KDF11-B boards. This quad height module is mounted next to the CPU.	FPF11
Memory Management Chip for use with the KDF11-AC and the KEF11-AA. It features 4 MB of 22-bit addressing, memory segmentation, built-in memory protection, and 40-pin DIP IC.	KTF11-AA
This two-chip EPROM set provides a number of special utilities used for developing, debugging, and downline loading software to the KXT11-AA using MicroPower/Pascal.	KXT11-A2
This two-chip EPROM set provides a number of special utilities used for developing, debugging, and downline loading software to the KXT11-AB using MicroPower/Pascal.	KXT11-A5

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
FPF11	1 Quad Slot	5.5	0.0	27.5	N/A	N/A
KEF11-AA	KDF11 Module	N/A	N/A	N/A	N/A	N/A
KEF11-BB	KDF11 Module	N/A	N/A	N/A	N/A	N/A
KTF11-AA	KDF11-AA Module KDF11-AC Module	N/A	N/A	N/A	N/A	N/A

For a discussion of the IxV11 family of industrial Q-bus I/O options turn back to the *Realtime Options* heading in this chapter.

Q-bus Analog I/O Option Order Codes

Option	Order Code
12-bit, 4-channel digital-to-analog converter and CRT control. Provides an output signal that meets the needs of many industrial and laboratory applications.	AAV11-C
12-bit, 16-channel analog-to-digital converter with program-controlled sampling rates to 25 kHz and external realtime clock, input for A/D trigger. Provides input capability for many industrial and laboratory applications.	ADV11-C
Combination 16-channel analog input and 2-channel analog output interface board. Features two analog output channels with ranges identical to the input channels.	AXV11-C

Analog options are available as **add-on options** for installation by technically experienced customers. They are compatible with the system backplane but are not installed in a Digital manufacturing facility. Analog options do not include I/O Connection Panel inserts, nor are they qualified for use in a FCC Class A system. UNIBUS analog options are described in the *Peripherals Handbook*.

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
AAV11-C	1 Dual Slot	2.5	0.0	12.5	N/A	N/A
ADV11-C	1 Dual Slot	2.0	0.0	10.0	N/A	N/A
AXV11-C	1 Dual Slot	2.0	0.0	10.0	N/A	N/A

RAM Memories

Digital offers a wide range of microcomputer products including RAM, ROM, PROM and multifunction boards.

MCV11

MCV11 modules provide CMOS static Random Access Memory with on-board battery backup.

MCV11 Order Codes

Option	Order Code
8 KB dual-height module with minimum data retention time of 2,647 hours (110 days). The MCV11-DA is a dual-height module.	MCV11-DA
32 KB dual-height module with minimum data retention of 1,180 hours (50 days). The MCV11-DC is a dual-height module.	MCV11-DC

MSV11

MSV11 memory modules are complete dynamic MOS memory subsystems.

64-KB dual-height module with 16K RAMs of 18-bit addressing.	MSV11-DD
128-KB dual-height module with 64K RAMs of 18-bit addressing.	MSV11-LF
256-KB dual-height module with 64K RAMs of 18-bit addressing.	MSV11-LK
512-KB quad-height module with 64K RAMs of 18-bit addressing.	MSV11-PL
1-MB quad-height module with 64K RAMs of 18-bit addressing.	MSV11-QA
2-MB quad height module with 256K RAMs of 18-bit addressing.	MSV11-QB
2-MB quad height module with 256K RAMs of 18-bit addressing.	MSV11-QC

ROM Memories**MRV11**

MRV11 PROM/ROM module with 16 sockets that accept customer-supplied, erasable UV PROM, fusible link PROM, or masked ROM devices. It also accepts several densities of ROM chips. The MRV11 can operate in window mapping address mode, and provides bootstrapping capability.

MRV11 Order Codes

Option	Order Code
Accommodates 24-pin devices up to and including 4K × 8 chips for a total capacity of 64 KB of 18-bit addressing.	MRV11-C
Accommodates 24- and 28-pin devices including 8K × 8 static RAMs, and 32K × 8 chips for a maximum of 512 KB of 18-bit addressing.	MRV11-D

Multifunction Modules

MXV11

MXV11 multifunction module features dynamic MOS RAM with on-board refresh, user-configuration with PROM or system device bootstrap ROM option, acceptance of two 5 V, 24-pin UVPROM or fusible link PROM chips, two serial lines meeting RS432 standard (backward compatible with RS232-C), baud rates up to 38.4K, and 50/60 Hz crystal clock.

MXV11 Order Codes

Option	Order Code
8-Kbyte RAM.	MXV11-AA
32-Kbyte RAM.	MXV11-AC
256 word bootstrap/diagnostic ROM set for use with the MXV11-AA, MXV11-AC, and MRV11-C. Supports 18-bit addressing and provides bootstrap support for the TU58, RL01, RL02, and RX02.	MXV11-A2
High density multifunction module includes 128-Kbyte RAM, two 28-pin user ROM sockets, two independently configurable asynchronous serial lines compatible with RS232-C and RS423, and a realtime clock configurable at 50, 60, or 800 Hz. Supports 22-bit addressing.	MXV11-BF
8K word bootstrap/diagnostic ROM set for use with the MXV11-BF or MRV11-D. Supports 22-bit addressing and provides bootstrap support for TU58, RL01, RL02, and RX02. Also supports RD50/RX50 and DECnet devices including DPV11, DUV11, DLV11-E and DLV11-F.	MXV11-B2

IEEE Option

IEEE Option Order Code

Option	Order Code
Instrumentation bus interface that connects the Q-bus to the 16-line IEEE-488 bus.	
Also turn back to the beginning of this chapter for additional memory and multifunction options.	IBV11-A

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Watts Drawn	Bus Loads Drawn	
		+ 5V	+ 12V		AC	DC
MCV11-DA	1 Dual Slot	1.90	0.00	9.50	2.0	1.0
MCV11-DC	1 Dual Slot	2.00	0.00	10.00	2.0	1.0
MRV11-C	1 Dual Slot	0.80	0.00	4.00	2.0	1.0
MRV11-D	1 Dual Slot	1.60	0.00	8.00	3.0	0.5
MSV11-DD	1 Dual Slot	1.70	0.37	12.94	2.0	1.0
MSV11-LF	1 Dual Slot	4.02	0.00	20.10	2.0	1.0
MSV11-LK	1 Dual Slot	4.02	0.00	20.10	2.0	1.0
MSV11-PK	1 Dual Slot	3.45	0.00	17.25	2.0	1.0
MSV11-PL	1 Dual Slot	3.60	0.00	18.00	2.0	1.0
MXV11-AA	1 Dual Slot	1.20	0.10	7.20	2.0	2.0
MXV11-AC	1 Dual Slot	1.20	0.10	7.20	2.0	2.0
MXV11-BF	1 Dual Slot	3.40	0.10	16.65	2.3	0.5
IBV11-A	1 Dual Slot	0.80	0.00	4.00	1.9	1.0
MSV11-QA	1 Quad Slot	2.80	0.00	14.00	2.0	1.0
MSV11-QB	1 Quad Slot	2.00	0.00	10.00	2.0	1.0
MSV11-QC	1 Quad Slot	2.80	0.00	14.00	2.0	1.0

System Enclosures

System Enclosure Order Codes	Option	Order Code
	The BA11-MB master box contains an 18-bit address backplane, the H9270. The H9270 has the Q-bus on slots A/B and C/D and can accept up to eight dual-height or four quad-height modules. Dimensions are 8.8 × 48.2 × 34.2 cm (3.5 × 19 × 13.5 in). The H780 power supply comes with a master console and provides 18 amps @ +5 V and 3.5 amps @ +12 V.	BA11-MB
	The BA11-SB master box contains a 4 × 9 slot backplane with 22-bit addressing on slots A/B only. The backplane accepts up to nine dual-height or nine quad-height modules and is compatible with the RLV21 and the RLV22 options. Dimensions are 13.2 × 48.3 × 57.8 cm (5.2 × 19 × 22.7 in). The power supply comes with a master console and provides 36 amps @ +5 V and 5 amps @ +12 V.	BA11-SB
	The BA23 master box contains a 4 × 8 22-bit address backplane. Slots one through three provide 22-bit addressing on slots A/B only; slots four through eight provide 22-bit addressing on slots A/B and C/D. Up to eight quad-height, or three quad-height and ten dual-height modules can be mounted. The BA23 has mounting space for as many as two of the following three mass storage devices, RD51, RD52 and RX50 alone or in any combination. Dimensions are: BA23-A Chasis—15 × 56.5 × 71.5 cm (6 × 22 × 28 in) BA23-AF Floormount—61.2 × 25.4 × 71.5 cm (24.5 × 10 × 28 in) BA23-AR Rackmount—13.1 × 47.5 × 64.8 cm (5.25 × 19 × 25 in) The power supply comes with a master console and provides 36 amps @ +5 V and 7 amps @ +12 V.	BA23-A
	Cabinet-mountable eight-slot expansion box with bezel required for 22-bit expansion of the PDP-11/23-PLUS system. Only one expansion box is supported by the PDP-11/23-PLUS. It must be mounted in the CPU cabinet, power controller is required.	BA11-SF

Cable Order Codes

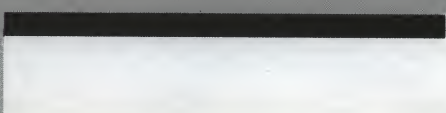
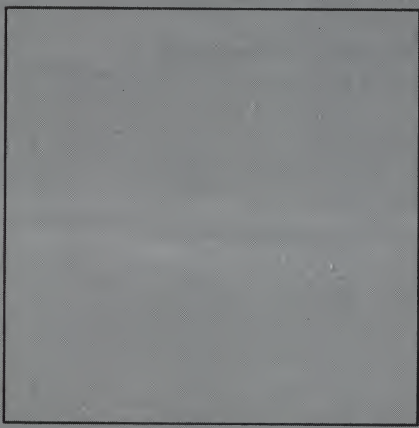
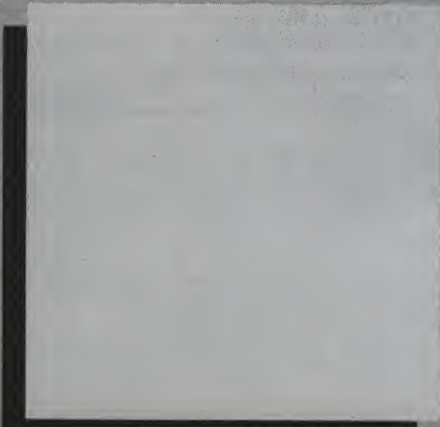
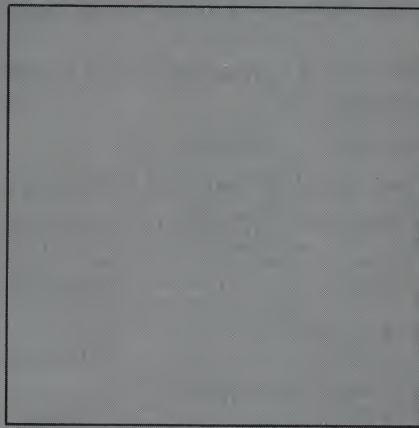
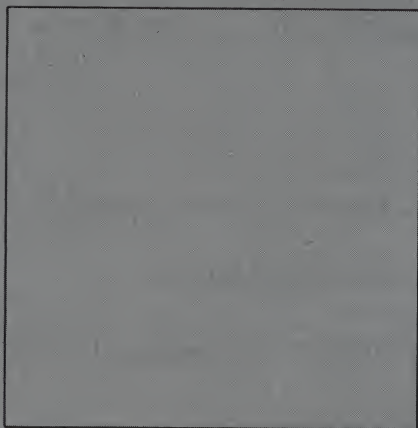
Option	Order Code
RS232-C null modem cable with a 10-pin AMP and a female connector. It is used with the DLV11-J and MXV11 to connect directly with an RS232-C cable coming from a terminal. The BC20N-05 is 1.5 meters (5 feet) long.	BC20N-05
RS232-C cable with a 10-pin AMP and a male connector. It can be used with the DLVJ1 or the MXV11 to connect to a modem or to the BC20N-05 cable. The BC21B-05 is 1.5 meters (5 feet) long.	BC21B-05
Jumper cable assembly used to expand the backplane from the first to second backplane or expansion box. It consists of two modules connected by two 1.8-meter (6-foot), 40-conductor Berg to Berg connectors.	BCV1A-06
Cable and assembly used for connecting the CPU box to the BA11-SF expansion box.	BCV2A-03

Backplanes Order Codes

Option	Order Code
4 × 4 slot 22-bit backplane with card guide is a Q-bus which will accept eight dual-height or four quad-height boards on slots A/B and C/D. The H9270 is compatible with the RLV12 and RLV22 options.	H9270
4 × 9 slot backplane with card guide is a Q-bus which will accept up to nine dual-height or quad-height boards on slots A/B and a special module interconnect bus on slots C/D. The H9273 is compatible with the RLV21 and RLV22 options.	H9273-A
The H9275 4 × 9 slot backplane with card guide is a non-expandable backplane with 22-bit addressing and built-in bus terminators. It contains the 22-bit addressing on slots A/B and C/D and will accept 18 dual-height or nine quad-height boards. It is compatible with the RLV12 and RLV22 options.	H9275-A
A family of three 18- or 22-bit backplanes with card guides.	H9281
2 × 4 slot backplane where the Q-bus on slots A/B accepts up to four dual-height modules.	H9281-BA
2 × 8 slot backplane with built-in bus terminators, and the Q-bus on slots A/B accepts up to eight dual-height boards.	H9281-BB
2 × 12 slot backplane which includes bus terminators. The Q-bus on slots A/B accepts up to 12 dual-height boards.	H9281-BC



ACE-54





BNE2A

The BNE2A is the transmission medium for the Ethernet system. It is a coaxial cable, manufactured to Digital's highest standards that operationally meets or exceeds the Ethernet specifications. This cable is designed to work with the H4000 Ethernet transceiver to provide complete network integrity.

Transceiver placement positions are marked on the cable every two and one-half meters. Coaxial cables can be joined together for network extensions by use of a barrel connector. Terminators are required to balance each network segment and are attached to the "N" type connectors at both open ends of the cable. The BNE2B cable is the same as the BNE2A, *except* PVC jacketed and PVC dielectric are used.

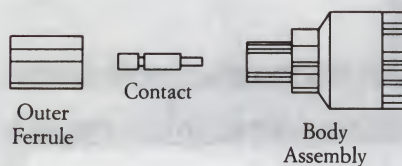
Features

- Double shielded; low capacitive ratings
- Tested and verified with the H4000 Ethernet transceiver
- FCC compliant when used with other Digital Ethernet products for specified Digital system applications
- Teflon™ cables for installations in environmental airspace and return air plenums
- Network can be extended up to 1,640 feet (500 meters) in a continuous Ethernet segment
- Accepts H4000 nonintrusive tap without network disruption
- High transfer impedance—which minimizes outside interference

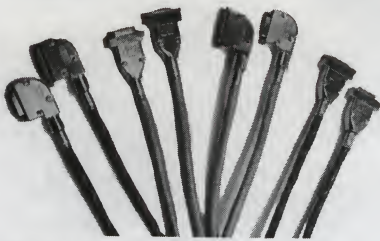
Specifications

- Number of Conductors: Single coaxial core, Teflon jacket and formed Teflon dielectric
- Gauge: 11.5-AWG, 500 HM
- Type of Cable: Round, O.D. 0.375 in
- Connectors: "N" type male coaxial connector, both ends

BNE2A Order Codes



Option	Order Code	Option	Order Code
23.4 meters (76.8 feet) Teflon coaxial cable.	BNE2A-MA	23.4 meters (76.8 feet) PVC jacketed coaxial cable.	BNE2B-MA
70.2 meters (230.3 feet) Teflon coaxial cable.	BNE2A-MB	70.2 meters (230.3 feet) PVC jacketed coaxial cable.	BNE2B-MB
117 meters (383.9 feet) Teflon coaxial cable.	BNE2A-MC	117 meters (383.9 feet) PVC jacketed coaxial cable	BNE2B-MC
500 meters (1,640 feet) Teflon coaxial cable.	BNE2A-ME	500 meters (1640 feet) PVC jacketed coaxial cable	BNE2B-ME

**BNE3A**

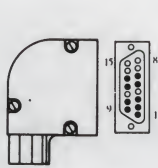
The BNE3A, B, C, and D cable assemblies are specifically designed for use with the H4000 Ethernet transceiver and the communication controllers. These transceiver cables provide the physical link from the Ethernet controller to the H4000 and then from subsequent H4000s on the network to other Ethernet nodes or stations. The transceiver cables are rugged and durable for heavy use in office and computer room environments.

Features

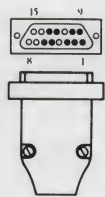
- Double shielded; low capacitive ratings
- Tested and verified with the H4000 Ethernet transceiver
- Teflon jacket and conductors for installations in environmental airspace and return air plenums without extra electrical conduit protection
- PVC cables offer a lower cost alternative to Teflon cables
- Transceiver cables can be attached together to form a continuous link as long as 50 meters (162 feet)
- Wide variety of cable options allows maximum network flexibility
- Individual shielded twisted pair conductors to reduce cross talk
- High transfer impedance that minimizes outside interference

Specifications

- Number of Connectors: 8 (4-TWP)
- Type of Cable: Round, impedance 78 Ω
- Gauge: 20-AWG
- Connectors: 15 pin "D" subminiature connectors, male and female
- Slide latch mechanisms for easy connections
- Straight (180°) or right-angled (90°) options

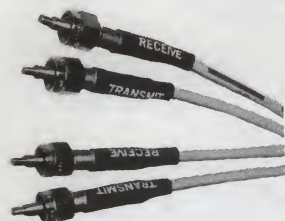
BNE3A Order Codes

Right Angle Type
Both ends (M-F)



Straight Type
Both ends (M-F)

Option	Order Code	Option	Order Code
5 meters (16.4 feet) PVC, straight entry cable	BNE3A-05	5 meters (16.4 feet) Teflon, straight entry cable	BNE3C-05
10 meters (32.8 feet) PVC, straight entry cable	BNE3A-10	10 meters (32.8 feet) Teflon, straight entry cable	BNE3C-10
20 meters (65.6 feet) PVC, straight entry cable	BNE3A-20	20 meters (65.6 feet) Teflon, straight entry cable	BNE3C-20
40 meters (131.2 feet) PVC, straight entry cable	BNE3A-40	40 meters (131.2 feet) Teflon, straight entry cable	BNE3C-40
5 meters (16.4 feet) PVC, right angle entry cable	BNE3B-05	5 meters (16.4 feet) Teflon, right angle entry cable	BNE3D-05
10 meters (32.8 feet) PVC, right angle entry cable	BNE3B-10	10 meters (32.8 feet) Teflon, right angle entry cable	BNE3D-10
20 meters (65.6 feet) PVC, right angle entry cable	BNE3B-20	20 meters (65.6 feet) Teflon, right angle entry cable	BNE3D-20
40 meters (131.2 feet) PVC, right angle entry cable	BNE3B-40	40 meters (131.2 feet) Teflon, right angle entry cable	BNE3D-40



BN25B

The BN25B is a dual channel, two-conductor fiber optic cable assembly. This cable was designed for use with the VS100 (VAX workstation) as well as the Ethernet, DEREK-R remote repeater. The cable is terminated with precision stainless steel SMA style connectors. The BN25B is designed to be used within building environments only. It could be installed outside if it was run inside a protected conduit, but only if the conduit is either below the frost line or not exposed to temperatures less than + 10°C.

Features

- Round cable construction allows for easier conduit installation
- Multiple layers of Kevlar™ strength members to maximize crush resistance
- Precision SMA style connectors that minimize dB loss

Specifications

- Number of conductors: Two
- Type of Fiber: 100/140 micron graded index (Corning 1508) 300 mHz.
- Type of Connectors: SMA style (amphenol 906 series) (4).
- Maximum Cable Loss: 6 dB/km.
- Operating Temperature: + 10° -70°C.
- Wiring: Transmit and receive lines are indicated by arrows, i.e. ← pointing away from connector = transmit; opposite for receive.

Used On

- VS100, DEREK-R

BN25B Order Codes

Option	Order Code	Option	Order Code
15 meters (49.21 feet)	BN25B-15	300 meters (984.25 feet)	BN25B-C0
30 meters (98.43 feet)	BN25B-30	500 meters (1,640 feet)	BN25B-E0
60 meters (196.85 feet)	BN25B-60	750 meters (2,460.63 feet)	BN25B-H5
90 meters (295.28 feet)	BN25B-90	1,000 meters (3,280.84 feet)	BN25B-L0
150 meters (492.13 feet)	BN25B-A5		



BN25C

The BN25C is a dual channel two-conductor "zipcord" style fiber optic cable assembly. This cable was designed for use with the FOCFA/FOCMA-AA RS232 to fiber optic converters. The cable is terminated with aluminum SMA style connectors. It's designed to be used within building environments only. It could be installed outside if it were run inside a protected conduit, but only if the conduit is either below the frost line or not exposed to temperatures less than + 10°C.

Features

- Industry standard "zip-cord" style design that minimizes cost.
- "Zip-cord" styling allows for greater tensile load on connectors that minimizes the chances of connector pull off.
- Aluminum SMA style connectors minimize cost and minimize dB loss.

Specifications

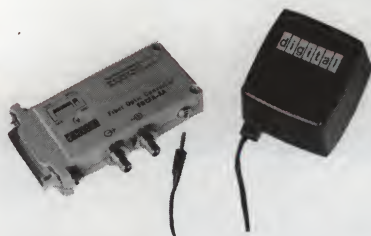
- Number of conductors: Two
- Type of Fiber: 100/140 micron graded index (Corning) 100 mHz maximum
- Type of Connectors: SMA style (Amphenol 906 series) (4)
- Maximum Cable Loss: 6 dB/km
- Operating Temperature: + 10° - + 70°C
- Wiring: Transmit and receive lines are indicated by arrows, i.e. ← pointing away from connector = transmit; opposite for receive.

Used On

- FOCFA, FOCMA

BN25C Order Codes

Option	Order Code	Option	Order Code
0.5 meters (1.64 feet)	BN25C-0E	100 meters (328.08 feet)	BN25C-A0
1 meter (3.28 feet)	BN25C-01	200 meters (656.17 feet)	BN25C-B0
3 meters (9.84 feet)	BN25C-03	300 meters (984.25 feet)	BN25C-C0
10 meters (32.81 feet)	BN25C-10	500 meters (1,640.42 feet)	BN25C-E0
25 meters (82.02 feet)	BN25C-25	1,000 meters (3,280.84 feet)	BN25C-L0
50 meters (164.04 feet)	BN25C-50		



FOCFA/FOCMA

The FOCFA/FOCMA is an RS232 to fiber optic converter. This device allows any asynchronous, serial line device to utilize a fiber optic link between the host CPU and a terminal or a serial printer and a terminal. The device is plug compatible with any RS232, 25-position D-sub connector. It transmits data only, not control signals. It is available with a female RS232 connector (FOCFA-AA) making it compatible with Digital devices as well as a male RS232 (FOCMA-AA) for use with many third party devices. This product is available in 120 volt 60 Hz model only.

Features

- RS232 plug compatible
- Extends an RS232 link up to 1,000 meters at 56 Kb/s., full duplex
- EMI/RFI immunity
- Complies with FCC Class B equipment requirements but is not tempest compliant
- DCE or DTE switchable
- Ground loop and surge isolation
- Data security and maintains a bit error rate of 10^{-9}

Specifications

- Power requirements through an ac to a dc power cube
- ac input voltage: 95-128 ac 60 Hz.
- dc output current: 80 to 130 mA
- Operating temperature: -20°C to $+85^{\circ}\text{C}$

Used On

- Any RS232 asynchronous serial line communication option or terminal.

Application Criteria

- Certain products by design will not accept the FOCFA/FOCMA due to connector spacing and/or cable routing restrictions. Products which will not accept the FOCFA/FOCMA include the Rainbow, DECmate and PRO 350 series.

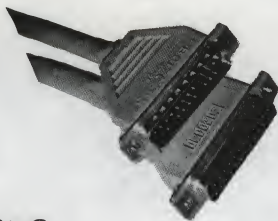
Pins Used

- | | | |
|-----------------|-------------------|---|
| 1—Case ground | 5—Clear to send | 7—Signal ground |
| 2—Transmit data | 6—Data set ready | 8—Receive line signal detect (jumped to pin 20) |
| 3—Receive data | 4—Request to send | 20—Data terminal ready (jumped to pin 8) |

FOCFA/FOCMA Order Codes

Option	Order Code
Female RS232 120 Vac	FOCFA-AA

Option	Order Code
Male RS232 120 Vac	FOCMA-AA



BC17C

The BC17C is a conductor, 100 percent shielded, modem cable with one each female and male 25-position RS232 connectors. This cable was designed primarily for use with the DECSA, Ethernet communication server, and high speed synchronous modems. This cable can also be used with any other RS232 synchronous or asynchronous modem products.

Features

- All timing leads are individually shielded and have individual drain wires and are wrapped together with a polyester tape binder
- Overall braid and foil shields with an overall drain wire
- 100% shielded, FCC compliant
- Rugged molded-on RS232 connectors with built in strain reliefs

Specifications

- Number of conductors: 17
- Gauge: 28-AWG
- Shield: 36-AWG tinned copper braid
- Wiring: Point-to-point

Used On

- DECSA, or any synchronous or asynchronous modem application

BC17C Order Codes

Option	Order Code	Option	Order Code
3 meters (10 feet)	BC17C-10	22.9 meters (75 feet)	BC17C-75
7.6 meters (25 feet)	BC17C-25	30.5 meters (100 feet)	BC17C-A0
10.2 meters (35 feet)	BC17C-35	60.9 meters (200 feet)	BC17C-B0
15.2 meters (50 feet)	BC17C-50	76.2 meters (250 feet)	BC17C-B5



BC17D

The BC17D is a 10-conductor, 100 percent shielded, null modem cable with two, 25-position female RS232 connectors. This cable was designed to be used for synchronous communications between a host CPU and a DECSA, Ethernet communications server, or another DECSA. It could also be used as a synchronous cable between DMF32's.

Features

- Timing leads (pins 15, 17) are both individually shielded with individual drain wires
- Overall braid and foil shields with overall drain wire
- 100% shielded, FCC compliant
- Rugged molded-on connectors with built in strain reliefs

Specifications

- Number of conductors: 10
- Gauge: 28-AWG
- Shield: 36-AWG tinned copper braid
- Wiring: Null Modem

Used On

- DECSA and between DMF32's

Pin Out

From	To	From	To	Jumpers	To	From	To
P1-1	P2-1	P1-2	P2-3	From			
P1-3	P2-2	P1-4	P2-8	P1 Side	4-5	P2 Side	4-5
P1-6	P2-20	P1-7	P2-7		6-22		6-22
P1-8	P2-4	P1-20	P2-6		15-24		15-24
P1-15	P2-17	P1-17	P2-15	Drains			
				P1 Side	15-7	P2 Side	15-7
					17-7		7-17

BC17D Order Codes

Option	Order Code
0.6 meters (2 feet)	BC17D-02
3 meters (10 feet)	BC17D-10
7.6 meters (25 feet)	BC17D-25

Option	Order Code
15.2 meters (50 feet)	BC17D-50
30.5 meters (100 feet)	BC17D-A0

BC17E

The BC17E is a 26-conductor (13 twp), 100 percent shielded, V.35 modem cable assembly with a 34-position male connector and a 37-position female D-subminiature connector. The cable was designed for high speed V.35 modem applications on the DESCA, Ethernet communications server, but could also be used with a DMR11, DMP11, or DMV11 with the appropriate cabinet kit.

Features

- Individually shielded twisted pairs
- Overall braid and foil shields with a drain wire
- 100% shielded, FCC compliant
- Molded-on connectors with built in strain reliefs

Specifications

- Number of conductors: 26 (13 twp)
- Gauge—conductors: 24-AWG
- Gauge—shield: 36-AWG tinned copper braid
- Wiring: null modem

Used On

- DECSA, DMR11, DMP11, DMV11

Pin Out

P1 = 34 pos. male

Pair	From	To	Pair	From	To	Pair	From	To
1	P1-V	P2-8	6	P1-D	P2-9	10	P1-J	P2-15
	P1-X	P2-26		P1-B	P2-19		P1-B	P2-19
2	P1-R	P2-6	7	P1-O	P2-7	11	P1-H	P2-12
	P1-T	P2-24		P1-B	P2-19		P1-B	P2-19
3	P1-Y	P2-5	8	P1-F	P2-13	12	P1-K	P2-10
	P1-a	P2-23		P1-B	P2-19		P1-B	P2-19
4	P1-P	P2-4	9	P1-E	P2-11	13	P1-A	P2-1
	P1-S	P2-22		P1-B	P2-19		P1-A	P2-1
5	P1-U	P2-17						
	P1-W	P2-35				Drain Wire		
						P1-B		P2-19

BC17E Order Codes

Option	Order Code
7.6 meters (25 feet)	BC17E-25

Option	Order Code
15.2 meters (50 feet)	BC17E-50

BC18L/BC18M

The BC18L and BC18M are four-conductor (two twisted pair), 100 percent shielded cable assemblies designed as the interface cable assemblies designed as the interface cable between the DMZ32-M and the H3014 remote distribution panel. These cables have 15 pin molded connectors on both ends one male and one female.

Features

- The cable is designed to meet all the standards for T1 interfacing
- Overall braid and foil shields with an overall drain wire
- Fully shielded rugged molded-on connectors with built in strain reliefs
- BC18L is for nonplenum rated applications
- BC18M is a fully rated plenum cable for applications required by state or local fire codes

Specifications

- Number of conductors: 4 (2 twisted pair)
- Gauge: Conductors 22-AWG
- Gauge: Shield 34-AWG tinned copper braid
- Wiring: Point-to-point

BC18L/BC18M Order Codes

Option	Order Code	Option	Order Code
15.2 meters (50 feet)	BC18L-50	15.2 meters (50 feet)	BC18M-50
30.4 meters (100 feet)	BC18L-A0	30.4 meters (100 feet)	BC18M-A0
45.7 meters (150 feet)	BC18L-A5	45.7 meters (150 feet)	BC18M-A5
76.2 meters (250 feet)	BC18L-B5	76.2 meters (250 feet)	BC18M-B5
106.7 meters (350 feet)	BC18L-C5	106.7 meters (350 feet)	BC18M-C5
152.4 meters (500 feet)	BC18L-E0	152.4 meters (500 feet)	BC18M-E0
226.6 meters (750 feet)	BC18L-H5	228.6 meters (750 feet)	BC18M-H5
304.8 meters (1000 feet)	BC18L-L0	304.8 meters (1000 feet)	BC18M-L0

BC22D

The BC22D is a fully shielded, null modem cable. It is designed to be used in asynchronous applications only. Its shielding characteristics have been tested and proven to limit RFI/EMI emissions in excess of industry standards. The cable has female RS232 molded-on connectors on each end.

Features

- Braided and foil shields
- Shielding effectiveness: 30 db minimum in 30 MHz-200 MHz range
- Rugged molded-on connectors
- Backward compatible with BC03M and BC22A
- Designed to be used with the DMF32 and DECSA
- Wide variety of standard lengths for flexible system configuration
- Connectors: two female, D-subminiature

Specifications

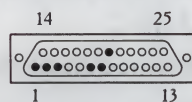
- Number of conductors: 6
- Gauge: 24-AWG
- Type of Cable: Round
- Shield: 36-AWG tinned copper braid
- Wiring: Null modem

Used On

- DMF32, DECSA or in place of BC03M or any RS232 communications option/bulkhead.

Connectors

- Two RS232 (female) connectors



RS232 Female

Option	Order Code	Option	Order Code
3.0 meters (10 feet)	BC22D-10	30.5 meters (100 feet)	BC22D-A0
7.6 meters (25 feet)	BC22D-25	60.9 meters (200 feet)	BC22D-B0
15.2 meters (50 feet)	BC22D-50	76.2 meters (250 feet)	BC22D-B5



BC22E

The BC22E is a fully shielded asynchronous modem cable. Its shielding characteristics have been tested and proven to limit RFI/EMI emissions in excess of industry standards. The cable has one male and one female RS232C molded-on connector.

Features include:

- Braided and foil shields
- Shielding effectiveness: 25 db minimum in 200 MHz-500 MHz range
- Rugged molded-on connectors
- Backward compatible with the BC22B
- Designed to be used with the DMF32 and DECSA
- Wide variety of standard lengths for flexible system configuration
- Connectors: One male and one female 25-position D-subminiature

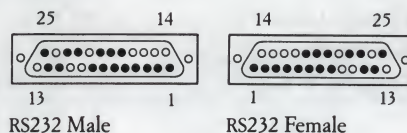
Specifications

- Number of connectors: 16
- Gauge: 24-AWG
- Shield: 36-AWG tinned copper braid
- Wiring: Point-to-point

Used On

- DMF32, DECSA or in place of BC22B or any RS232C communications option/Bulkhead.

Connectors



BC22E Order Codes

Option	Order Code
3.0 meters (10 feet)	BC22E-10
7.6 meters (25 feet)	BC22E-25
15.2 meters (50 feet)	BC22E-50

Option	Order Code
30.5 meters (100 feet)	BC22E-A0
60.9 meters (200 feet)	BC22E-B0
76.2 meters (250 feet)	BC22E-B5



BC22F

BC22F is a fully shielded 25-conductor EIA cable. Its shielding characteristics have been tested and proven to limit RFI/EMI emissions in excess of industry standards. The cable should be used as a replacement in traditional BC05D asynchronous applications. It was also designed as the synchronous cable for use on the DMF32 synchronous port and synchronous modems.

Features

- Braided and foil shields
- Shielding effectiveness: 25 db minimum in 200 MHz-500 MHz range
- Rugged molded-on connectors

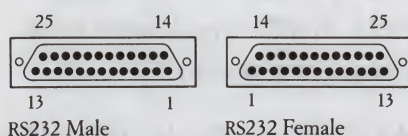
Specifications

- Number of Conductors: 25
- Gauge: 24-AWG
- Shield: 36-AWG tinned copper braid
- Wiring: Point-to-point

Used On

- DMF32, in place of BC05D

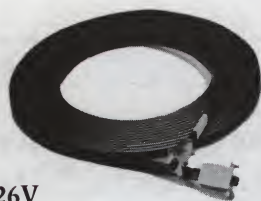
Connectors



BC22F Order Codes

Option	Order Code
3.0 meters (10 feet)	BC22F-10
7.6 meters (25 feet)	BC22F-25
15.2 meters (50 feet)	BC22F-50

Option	Order Code
30.5 meters (100 feet)	BC22F-A0
60.9 meters (200 feet)	BC22F-B0
76.2 meters (250 feet)	BC22F-B5



BC26V

The BC26V is designed as the interface cable between controllers and storage interconnect (SI) type storage devices. The cable is a flat ribbon four coaxial cable with two stranded conductors as stress members. Within each coax conductor there are individual drain conductors.

Features

- Triple shielded coax to ensure signal integrity
- Stress members provide additional conductor protection
- Individual ground wires for each signal conductor

Specifications

- Number of Conductors: 4
- Gauge: Conductors – 30-AWG; Drains – 28-AWG; Stress member – 16-AWG

Used On

- RA80, RA60 and RA81 (SI devices only)

Connectors:

- Two 8-position, 2 × 4

BC26V Order Codes

Option	Order Code
3.7 meters (12 feet)	BC26V-12
7.6 meters (25 feet)	BC26V-25

Option	Order Code
15.2 meters (50 feet)	BC26V-50
24.4 meters (80 feet)	BC26V-80



BCC04

The BCC04 is the modem cable specifically designed for use with the personal computer product family and the VT200 series of products. The cable is used to connect any personal computer with a modem, in addition it is used as a printer cable for Rainbow 100s.

Features

- Fully shielded cable and connector assembly
- Molded-on strain relief
- Connectors: One male and one female 25-position D-subminiature molded-on construction

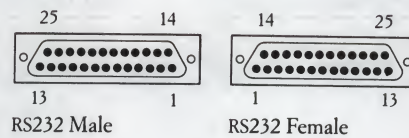
Specifications

- Number of Conductors: 25
- Gauge: 26-AWG
- Wiring: Point-to-point

Used On

- PC100, PC278, PC325, PC350 and VT200 series

Connectors



BCC04 Order Codes

Option	Order Code	Option	Order Code
7.6 meters (25 feet)	BCC04-25	15.2 meters (50 feet)	BCC04-50

BCC05

The BCC05 is the printer cable designed specifically for the DECmate II, Professional and VT200 series of products. This cable is used to connect these personal computers with any of the specified Digital printers.

Features

- Fully shielded cable and connector assembly
- Molded-on connectors and strain reliefs
- Connectors: One 9 position female D-subminiature and one 25 position female D-subminiature

Specifications

- Number of Conductors: 7
- Gauge: 26-AWG

Used On

PC278, PC325, PC350, VT200 Series, LA50, LA100, LQP02

Connectors



BCC05 Order Codes

Option	Order Code	Option	Order Code
3.0 meters (10 feet)	BCC05-10	15.2 meters (50 feet)	BCC05-50
7.6 meters (25 feet)	BCC05-25	30.5 meters (100 feet)	BCC05-A0



BNCIA

The BNCIA cable is designed as the interface cable for Digital's high band-width, short distance, local computer interconnect (CI). Each BNCIA cable consists of four separate, but identical cables. The cable is used to interconnect either CPUs to the star coupler (SC008) or storage controllers to the star coupler.

Features

- Double braid and foil shields
- Coax cable to ensure signal integrity
- TNC type connectors to ensure proper grounding and durability

Specifications

- Number of Conductors: one
- Gauge: .410 diameter
- Outside Jacket: P.V.C.

BNCIA Order Codes

Option	Order Code
10 meters (32.81 feet)	BNCIA-10
20 meters (65.62 feet)	BNCIA-20

Option	Order Code
45 meters (147.64 feet)	BNCIA-45

BN27D

The BN27D is a 24 conductor (12 twisted pair) 100% shielded cable assembly designed exclusively for use as the interface cable for all the long line, high speed printer products sold by Digital. The cable is designed to be conduit installable, having one end fully connectorized and the other end only with the appropriate pins attached with no backshell or connector. Both ends use 37 pin D sub style connectors one male and one female. Only the female end is fully assembled and attaches to the BN27B cable. This completed cable is used to connect the filtered connector panel of the long line interface on the CPU end to the BN27B cable on the printer end both of which are included with the long line printer options (LLD11s and LN01Ks).

Features

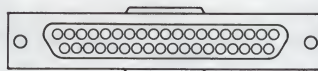
- Because this cable is going to be used in lengths exceeding 100 feet it was designed to be easily conduit installed to simplify the installation of the long line printers
- Full shielded and FCC compliant
- Connector is a rugged die cast metal shell
- Offered in four different standard lengths for maximum system flexibility
- The partial assembled end is protected by shrink tubing which protects it from damage during the installation process
- The balance of the connector hardware as well as the pin out and installation instructions are included with the LLD11 long interface option which is required for all long line printers.

Specifications

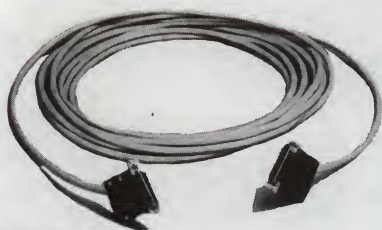
- Number of Conductors: 24 (12 twisted pair)
- Gauge: Conductors 24-AWG
- Gauge: Shield 36-AWG Tinned Copper Braid
- Wiring: per wire chart supplied with LLD11 and LN01K long line options

Used On

LSP25, 26, LP27-D or LN01Bs with LN01K-AA; LN01S with LN01K-LF

Connector**BN27D Order Codes**

Option	Order Code	Option	Order Code
70 meters (229.7 feet)	BN27D-70	220 meters (721.8 feet)	BN27D-B2
150 meters (492.1 feet)	BN27D-A5	300 meters (984.3 feet)	BN27D-C0



BC03M

The BC03M is a null modem cable for local EIA connections. It features a 25-pin RS232 female connector at each end. The cable can be used with Digital processors not manufactured by Digital Equipment Corporation. A typical hook-up would be one end to the male connector of the EIA processor interface cable and the other end to a male connector of an EIA terminal. **Note:** For lengths less than 250 feet use BC22D. Cables are preassembled—with only one end fully terminated so the cable can be run through conduit.

Features

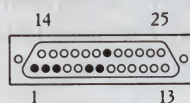
- Individually shielded conductors
- 3-twz to reduce cross-talk on signal lines
- Connectors: two RS232 female connectors
- Ideally suited for long length applications

Specifications

- Number of Conductors: 6 (3-twz)
- Gauge: 22-AWG
- Type of Cable: round
- Wiring: null modem

Connectors

- Two RS232 (female) connectors

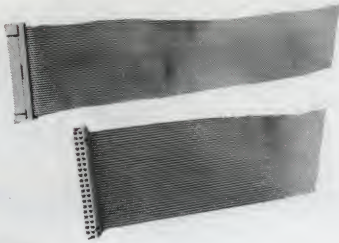


RS232 Female

BC03M Order Codes

Option	Order Code
76.2 meters (250 feet)	BC03M-B5
152.4 meters (500 feet)	BC03M-E0

Option	Order Code
304.8 meters (1,000 feet)	BC03M-L0



BC05L

The BC05L is a 40-conductor flat cable assembly. It can be used as a multi-purpose cable when doing interface design.

Features

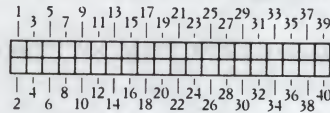
- Flat type cable conserves space and weight
- Flexible and resistant to compressive loading

Specifications:

- Number of Conductors: 40
- Gauge: 30-AWG
- Type of Cable: Flat ribbon
- Wiring: Reverse configuration (pin 1 to pin 40 – pin 2 to pin 39, etc.)

Connectors

- Type H855 Both Ends (shown mating side up) (mates with H854)



BC05L Order Codes

Option	Order Code
.075 meters (.25 feet)	BC05L-0C
1.8 meters (6 feet)	BC05L-06
4.6 meters (15 feet)	BC05L-15

Option	Order Code
7.6 meters (25 feet)	BC05L-25
15.2 meters (50 feet)	BC05L-50

BC05W

The BC05W is a 50-conductor, flat, shielded signal cable. It is a general purpose cable which can be connected to a variety of devices at the user's discretion. The BC05W is especially well suited for parallel interface connections. The BC05W is a shielded cable assembly with two 50-conductor mass terminated connectors for easy insertion into the interface connector pins.

Features

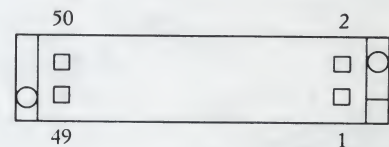
- Ribbon type cable conserves space and weight; it is flexible and resistant to compressive loading
- Copper ground plane shield
- Gold plated connector contacts
- Built-in strain relief

Specifications

- Number of Conductors: 50
- Gauge: 28-AWG
- Type of Cable: flat ribbon
- Wiring: point-to-point

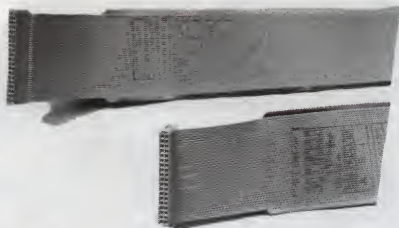
Connectors

- Two 50-Conductor Female Socket



Option	Order Code
1.2 meters (4 feet)	BC05W-04
3.0 meters (10 feet)	BC05W-10

Option	Order Code
4.6 meters (15 feet)	BC05W-15
7.6 meters (25 feet)	BC05W-25

**BC06R**

The BC06R is a flat ribbon input/output cable assembly used for controller connections. Three BC06R cable assemblies are used for each MASSBUS to controller connection. These cables plug into three controller transceivers and connect to the external MASSBUS cable (BC06S), via a flat to round transition connector located on the MASSBUS controller.

For UNIBUS connections the BC06R is used to connect an RLO1/2 to the RL11. A maximum of four RLO1/2 units can be connected to the RL11.

Features

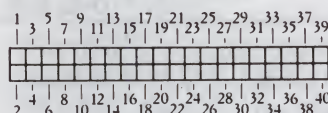
- Shielded
- Flat type cable conserves space, mechanically flexible and resistant to compressive loading
- Connectors: Two H855 connectors

Used On

- RMO2, RMO3, RPO4, RPO6, RPO7, RLO1, RLO2, TU77, TE16, TU45 AND RH780.

Connectors

- Two H855 connectors

**BC06R Order Codes**

Option	Order Code
0.6 meters (2 feet)	BC06R-02
1.8 meters (6 feet)	BC06R-06
3.0 meters (10 feet)	BC06R-10

Option	Order Code
3.7 meters (12 feet)	BC06R-12
7.6 meters (25 feet)	BC06R-25
15.2 meters (50 feet)	BC06R-50

**BC06S**

The BC06S is a round input/output cable assembly for external MASSBUS connections. It is a strong, rugged cable used to connect the MASSBUS controller to the disk substation. The cable is also used to daisy-chain as many as eight disk substations from one MASSBUS controller. At the controller, the BC06R cable assemblies via a flat to round transition panel connector.

Features

- Strain relief housings on each end
- Installed drain wires
- Impedance-controlled cable
- Customer selectable keying
- Twisted pair conductors to reduce cross-talk
- Double shielded
- Rugged outside jacket for protection
- Connectors: Two zero insertion force (ZIF) keyed connectors ensure trouble-free, no mismatch connections for MASSBUS units

Specifications

- Number of Conductors: 120 (60-twtp)
- Gauge: 28-AWG
- Type of Cable: Round

BC06S Order Codes

Option	Order Code	Option	Order Code
1.2 meters (4 feet)	BC06S-04	7.6 meters (25 feet)	BC06S-25
3.0 meters (10 feet)	BC06S-10	15.2 meters (50 feet)	BC06S-50
4.6 meters (15 feet)	BC06S-15	22.9 meters (75 feet)	BC06S-75

BC06Z

The BC06Z is a round input/output cable assembly for external MASSBUS connections. It is used to connect the MASSBUS controller to the disk or tape substation. The cable is also used to daisy-chain as many as eight disk or tape substations from one MASSBUS controller.

Features

- Overall braided shield
- External grounding wires
- Twisted pair conductors to reduce cross talk
- Double internal conductor shielding
- Installed drain wires (inner and outer)
- Rugged outside jacket for protection
- Field adjustable connector angles

Specifications

- Number of Conductors: 120 (60-twtp)
- Gauge: 28-AWG
- Type of Cable: Round

Connectors

- Zero insertion force (ZIF) keyed connectors ensure trouble free no mismatch connectors.

BC06Z Order Codes

Option	Order Code	Option	Order Code
4.6 meters (15 feet)	BC06Z-15	15.2 meters (50 feet)	BC06Z-50
7.6 meters (25 feet)	BC06Z-25	30.5 meters (100 feet)	BC06Z-A0



BC08R/BC08S

The BC08R and BC08S are flat ribbon 40-conductor cable assemblies that are designed to provide low noise, and trouble-free connections to a large number of Digital and non-Digital units. They are both manufactured to Digital's stringent quality standards. The BC08R and BC08S are used extensively with Digital PDP-8 and PDP-11 processor for multiple interfacing applications.

Features

- Full ground shield
- Mass terminated
- Thin, lightweight, mechanically flexible, compact, resistant to compressive loading
- Easy insertion into mating H854 connector on application device
- Connectors: One H855 connector on each end

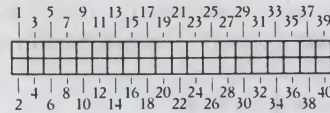
Specifications

- Number of Conductors: 40
- Gauge: 30-AWG
- Type of Cable: Flat ribbon
- Wiring: BC08R—The basic flexible design allows the cable to be twisted in a complex assembly. Wired in reverse configurations. (Pin 1 to 40, Pin 2 to 39, etc). BC08S—point-to-point

Connectors

- Two 40-conductor H855 connectors

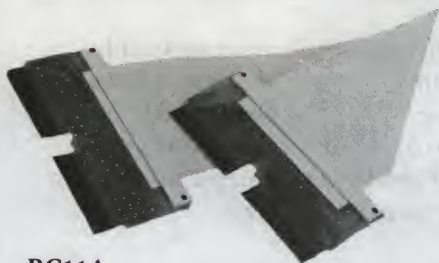
Female Socket pins



BC08R Order Codes

Option	Order Code
0.3 meters (1 foot)	BC08R-01
0.9 meters (3 feet)	BC08R-03
1.2 meters (4 feet)	BC08R-04
1.8 meters (6 feet)	BC08R-06
3.0 meters (10 feet)	BC08R-10
3.7 meters (12 feet)	BC08R-12
6.1 meters (20 feet)	BC08R-20
7.6 meters (25 feet)	BC08R-25
15.2 meters (50 feet)	BC08R-50

Option	Order Code
18.2 meters (60 feet)	BC08R-60
0.3 meters (1 foot)	BC08S-01
0.6 meters (2 feet)	BC08S-02
1.8 meters (6 feet)	BC08S-06
2.4 meters (8 feet)	BC08S-08
3.0 meters (10 feet)	BC08S-10
4.6 meters (15 feet)	BC08S-15
7.6 meters (25 feet)	BC08S-25
15.2 meters (50 feet)	BC08S-50



BC11A

The BC11A is a 120-conductor, flat ribbon cable used to connect system units in different mounting drawers or assemblies. The 120-conductors include all the 56 UNIBUS signal lines plus 64 grounds. Signals and grounds alternate to minimize cross-talk. The ground wires provide the ground plane necessary to establish characteristic impedance and also shield the signal lines from each other for cross-talk protection. The BC11A is designed for the high-speed bus structure shared by the PDP-11 processor, memory and all peripherals.

Features

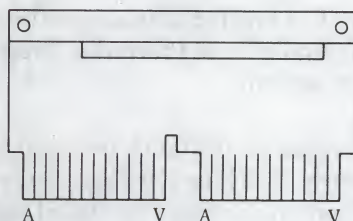
- Two, flat FLEXIPRINT cables with additional insulation between them to minimize cross-talk
- Easy insertion to UNIBUS and peripheral backplanes
- Gold-plated contact fingers on M-Series connectors
- Mechanically flexible and resistant to compressive loading
- Connectors: M929 module connector on one end; M919 module connector at the other end

Specifications

- Number of Conductors: 120
- Type of Cable: Flat, ribbon Flexiprint

Connectors

- M929 Module Connector



BC11A Order Codes

Option	Order Code
0.6 meters (2 feet)	BC11A-02
0.9 meters (3 feet)	BC11A-03
1.5 meters (5 feet)	BC11A-05
1.8 meters (6 feet)	BC11A-06
2.4 meters (8 feet)	BC11A-08
3.0 meters (10 feet)	BC11A-10

Option	Order Code
4.6 meters (15 feet)	BC11A-15
6.1 meters (20 feet)	BC11A-20
7.6 meters (25 feet)	BC11A-25
10.7 meters (35 feet)	BC11A-35
15.2 meters (50 feet)	BC11A-50

The following information is provided for Digital clientele who wish to order detachable Wall Plug cord sets, Equipment-to-Equipment cord sets or Equipment Connecting Sockets for Digital equipment. Different power standards necessitate many different types of electrical connections. Digital works with worldwide electrical regulatory agencies and standards groups to assure the safe and satisfactory operation of our equipment wherever it is used.

How to Order*Ordering Categories*

There are four sets of ordering instructions—

Set No.	Instructions to Order
1.	Replacement Cord Sets and Equipment Sockets
2.	Equipment-to-Equipment Cord Sets to Connect Items On This Order to Your Existing Equipment
3.	Wall Plug Cord Sets for Items On This Order
4.	Equipment-to-Equipment Cord Sets to Connect Items On This Order

There are four reference sections—

Section No.	References
1.	Wall Plug and Socket Photographs
2.	Equipment-to-Equipment and Socket Photographs
3.	Wall Plug and Socket Identification Chart
4.	Equipment Plug and Socket Identification Chart

To order, first find the instruction title in the left hand column that matches your ordering requirement. Proceed as directed by the instruction, using the called for reference sections.

1. Replacement Cord Sets and Equipment Sockets

The following information is provided for Digital clientele who wish to order replacement Wall Plug Cord Sets, Equipment-to-Equipment cord sets or Equipment Connecting Sockets for Digital equipment anywhere in the world.

Wall Plug Cord Set

To order replacement Wall Plug cord sets that run from the wall with a wall plug on one end and an equipment plug on the other end—

1. note the letter code in the Wall Plug and Socket photograph that matches the wall plug you use
2. match the photograph letter code to the Reference letter code in the "Wall Plug and Socket identification" chart
3. note the corresponding Purchase Specification number
4. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the equipment plug you use
5. call your local Digital Field Service Center or Sales Representative and site the wall plug Purchase Specification number and the equipment plug letter code. State whether straight and/or right angle plugs are required

Equipment-to-Equipment Cord Set

To order replacement equipment-to-equipment cord sets with connectors on both ends of the cord –

1. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the equipment-to-equipment cord set you use
2. match the photograph letter code to the Reference letter code in the “Equipment Plug and Socket” identification chart
3. note the Specification Number
4. call your local Digital Field Service Center or Sales Representative and site the Specification Number and the photograph letter code. State whether straight and/or right angle connectors are required

Equipment Connecting Socket

To order a replacement equipment connecting socket for your existing equipment –

1. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the equipment connecting socket in your equipment
2. match the photograph letter code to the Reference letter code in the “Equipment Plug and Socket” identification chart
3. note the Specification Number
4. call your local Digital Field Service Center or Sales Representative and site the Specification Number and the photograph letter code. State the catalog number of the piece of equipment in which the connecting socket is found

Missing Wall Plug Cord Set

To order missing Wall Plug cord sets that run from the wall with a wall plug on one end and an equipment plug on the other end –

1. note the letter code in the Wall Plug and Socket photograph that matches the wall socket you use
2. match the photograph letter code to the Reference letter code in the “Wall Plug and Socket” identification chart
3. note the corresponding Purchase Specification Number
4. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches your equipment connecting socket
5. call your local Digital Field Service Center or Sales Representative and site the wall socket and equipment plug Purchase Specification Number, both picture letter codes, and state whether straight and/or right angle plugs are required

Missing Equipment-to-Equipment Cord Set

To order missing equipment-to-equipment cord sets with connectors on both ends of the cord –

1. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the sockets in the connected equipment
2. match the photograph letter code to the Reference letter code in the “Equipment Plug and Socket” identification chart
3. note the Specification Number
4. call your local Digital Field Service Center or Sales Representative and site the Specification Number and the photograph letter code. State whether straight and/or right angle connectors are required

*Missing Equipment Connecting
Socket*

To order a missing equipment connecting socket for your existing equipment –

1. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the plugs on your equipment-to-equipment cord set
2. match the photograph letter code to the Reference letter code in the “Equipment Plug and Socket” identification chart
3. note the Specification Number
4. call your local Digital Field Service Center or Sales Representative and site the Specification Number and the photograph letter code

**2. Equipment-to-Equipment Cord
Sets to Connect Items On This Order
To Your Existing Equipment**

The following information is provided for Digital clientele who wish to order Equipment-to-Equipment Cord Sets to connect items on this order to existing equipment

Equipment-to-Equipment Cord Set

To order Equipment-to-Equipment cord sets with connectors on both ends of the cord –

1. note the letter code in the Equipment-to-Equipment Plug and Socket photograph that matches the socket in your existing equipment
2. match the photograph letter code to the Reference letter code in the “Equipment Plug and Socket” identification chart
3. note the Specification Number
4. state on the order, the catalog number of the existing equipment and state to which new piece of equipment it is to be connected. State the Specification Number, the photograph code, and whether a straight or right angle connector is required for the existing piece of equipment

**3. Wall Plug Cord Sets For Items On
This Order**

The following information is provided for Digital clientele to order Wall Plug or Equipment-to-Equipment cord sets for new equipment to be used anywhere in the world. State the country in which the equipment will be used on all new equipment orders.

*Wall Plug Cord Set for Use in
Ordering*

(Order just the wall plug and cord set, Digital automatically provides the required equipment connection on new equipment orders.)

1. note the letter code in the Wall Plug and Socket photograph that matches the wall socket that will be used
2. match the photograph letter code in the “Wall Plug and Socket Identification” chart
3. state on the order the corresponding Purchase Specification Number

Wall Plug Cord Set for Use in Another Country

(Check with your Digital Sales Representative, in some countries more than one electrical standard is used. Order just the wall plug and cord, Digital automatically provides the required equipment connection on new equipment orders.)

1. if known, note the letter code in the Wall Plug and Socket photograph that matches the wall plug that will be used, if not known go to step number four
2. match the photograph letter code to the Reference letter code in the "Wall Plug and Socket Identification" chart
3. state on the order the corresponding Purchase Specification Number and the photograph letter code

(in all cases the following information must be provided)

4. state on the order the country in which the equipment is to be used

4. Equipment-to-Equipment Cord Sets to Connect Items On This Order

The following information is provided for Digital clientele who wish to order Equipment-to-Equipment cord sets for items found on this order.

Equipment-to-Equipment Cord Set

To order Equipment-to-Equipment cord sets with connectors on both ends of the cord—

1. state on the order which two pieces of new equipment each cord is to connect (See instruction 2 to order Equipment-to-Equipment cord sets to go from new equipment to existing equipment.)

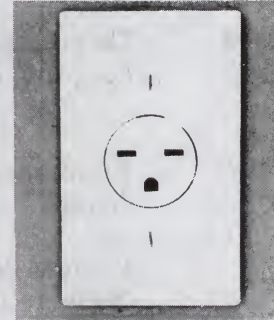
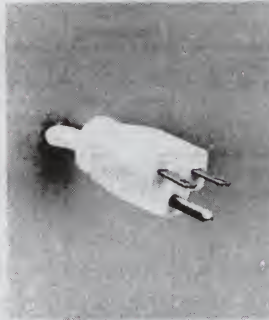
Plug

Socket

A



B



C



D



E



Socket E not shown

Plug

Socket

F

Plug F not shown

G

H

I

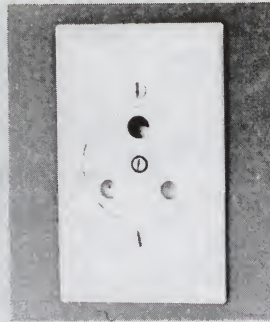
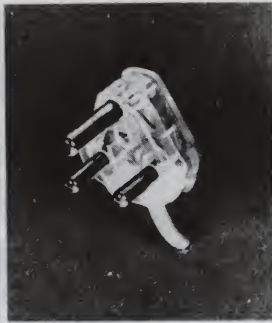
K

Socket K not shown

Plug

Socket

M



N



Socket N not shown

Plug

Socket

P



Q



R



REFERENCE		COUNTRY USED	SOCKET CURRENT (Maximum)	TYPE	PURCHASE SPECIFICATION A-PS-	COMMENTS
A _p	A _s	USA, Canada, Mexico, Japan	15A	NEMA 120 V	1700083-0-0	*see note 1 *see note 2
B _p	B _s		15A	NEMA 240 V		
C _p	C _s	Australia, New Zealand	10A 15A		1700198-0-0	Plug type shown on figure is rated at 10 A. Plugs that are physically larger and rated at 15 A and 20 A are also available. However, the 20 A plug is not supported by Digital. Two types of plugs are defined in the power cord specification.
D _p	D _s	Germany	16 A	Schuko R1 CEE-7-4	1700199-0-0	Plug type D _p not supplied by Digital. Use plug type E _p .
E _p		Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Sweden,	16 A	Schuko R2 CEE-7-7	1700199-0-0	D _p should be used with socket D _s and F _s which contain a ground connection.
	F _s	France, Belgium	16 A			Use plug type E _p .
G _p	G _s	United Kingdom	13 A	flat pin BS1363	1700209-0-0	*see note 1. The plug contains a removable fuse. Refer to Digital specification no. 1218309-0-0 for replacement fuse. The socket is shuttered and contains a power switch.
H _p	H _s	Switzerland	10 A		1700210-0-0	Most commonly used socket. Other sockets also used.
J _p	J _s	Denmark	16 A		1700310-0-0	CAUTION—Plug types D _p and E _p often used in the socket. They do not contain a grounding pin for an earth (E) connection. Use plug J _p in this socket.
K _p		Italy	10 A		17000364-0-0	Most commonly used socket. Other sockets also used. Plug shown on figure is rated at 10 A. A plug that is physically larger and rated at 16 A is also available. Two types of plugs are defined in the power cord specification.
M _p	M _s	South Africa, India	16 A	round pin (old BS546)	1700456-0-0	*see note 1. The socket is shuttered and is an old United Kingdom standard.
N _p		Israel	16 A		1700457-0-0	Most commonly used. Other types also used.

Note 1 This socket may be in used in countries other than those listed.

Note 2 Dual sockets that will accept two plug types are to be found in South America.

EQUIPMENT PLUG AND SOCKET IDENTIFICATION

REFERENCE		COUNTRY USED	SOCKET CURRENT (Maximum)	TYPE	PURCHASE SPECIFICATION A-PS-	COMMENTS
P _p	P _s	World Usage	6 A @ 250 V	CEE 22 IEC 320	17/00365-0-0	Power cord sets contained in this purchase specification consist of an IEC/CEE plug on each end of the cable.
Q _p	Q _s	World Usage	6 A @ 250 V	CEE 22 IEC 320	17/00365-0-0	Power cord sets contained in this purchase specification consist of an IEC/CEE plug on each end of the cable.
R _p	R _s	World Usage	10 A @ 250 V	CEE 22 ICE 320	17/00365-0-0	Power cord sets contained in this purchase specification consist of an IEC/CEE plug on each end of the cable.

*(CEE) International Commission on Rules for the Approval of Electrical Equipment.
(IEC) International Electrotechnical Commission.

Digital BC-Type Cable Index

Length	Description	Where Used	Order Code
-	MASSBUS cable, 45° connector (60-TWPR)	MASSBUS devices	BC06S.*
7.62 m (25 ft)	MASSBUS cable 45° connectors double shielded (60-TWPR) 120-conductor, ZIF connectors	DR780	BC06V-25
18.29 m (60 ft)			BC06V-60
24.39 m (80 ft)			BC06V-80
4.57 m	MASSBUS cable, 90° connectors, double shielded, grounding pigtails (60-TWPR), 120-conductor, ZIF connectors, length of grounding pigtails differs per specified applications. CPU to drive and from drive to drive. Different applications require different length grounding pigtails.	RM05, RM80	BC06Y
4.57 m		RM80-C	BC06Y
7.62 m			BC06Y
7.62 m			BC06Y
7.62 m			BC06Y
15.24 m			BC06Y
15.24 m			BC06Y
-	Double shielded, MASSBUS cable	RP07, TU78	BC06Z.*
-	H856 one end only, 20 twisted pair	M1501	BC07A
-	H856 one end only (2) 20-conductor ribbons	General purpose	BC07D
.91 m	M903 to M903 dual shielded mylar	DT03	BC08A
1.52 m (5 ft)		MX15	BC08A-05
2.13 m (7 ft)		PDP-15	BC08A-07
3.05 m (10 ft)		PA63	BC08A-10
7.62 m		PDP-15	BC08A
		TE10	
		XM15	
		XM15	
		AIP12	
		TU10, TMA11	
		PC12	
		KB8	
.15 m (3.5 ft)	PDP-8 bus expansion cable	PDP-8	BC08H-3F
.46 m (4.5 ft)	M936 to M937		BC08H-4F
1.83 m (6 ft)	H855 to M953, 40-conductor flat ribbon I/O cable	PDP-8	BC08J-06
3.05 m			BC08J
4.57 m			BC08J
7.62 m (25 ft)			BC08J-25
15.24 m			BC08J
1.83 m	M955 to H856, 10 ohm, 40-conductor flat ribbon cable	PDP-8	BC08K
3.05 m (10 ft)			BC08K-10
4.57 m			BC08K
.28 (.9 ft)	H807 + M901 to (2) mylar cables to M901 + H807	PDP-8	BC08M-0M
4.57 m (15 ft)	M904 to M904 dual round coaxial	PDP-8	BC08N BC08N-15
-	H856 to H856 flat ribbon cable, wired reversed A-VV	General purpose I/O	BC08R*
-	H856 to H856 flat ribbon cable, wired point-to-point	General purpose I/O	BC08S.*

3.05 m (10 ft)	50-pin Berg to 50-pin Berg	KL8-A	BC08Y-10
1.52 m (5 ft)	W857 and W858, each end (4) 9-conductor coaxial cables	PDP-10 memory bus	BC10H-05
3.05 m			BC10H
7.62 m			BC10H
10.67 m			BC10H
1.52 m	AMP quick latch to (2) H857 and (2) H858, (8) 9-conductor coaxial cables	PDP-10 memory bus	BC10J
3.05 m			BC10J
4.57 m			BC10J
7.62 m			BC10J
10.67 m			BC10J
-	PDP-11 bus expansion cable M919 to M929	PDP-11	BC11A.*
3.66 m (12 ft)	H856 to H856, 18 twisted pair	LA180	BC11S-12
7.62 m (25 ft)			BC11S-25
15.24 m (50 ft)			BC11S-50
30.48 m (100 ft)			BC11S-A0
3.05 m (10 ft)	Fully shielded EIA extension cable, 17-conductor	DECSA	BC17C.*
7.62 m (25 ft)			
3.05 m (10 ft)	Fully shielded, 10-conductor synchronous null modem cable with (2) female RS232 connectors	DECSA	BC17D.*
7.62 m (25 ft)			
	Fully shielded, V.35 modem cable for M3101 (1) D-subminiature to Winchester	DECSA	BC17E.*
3.05 m (10 ft)	DLV11-J to DLV11-J interconnect cable 2 x 5 pin connectors, both ends	DLV11-J	BC20M-10
7.62 m (25 ft)			BC20M-25
15.24 m (50 ft)			BC20M-50
1.52 m (5 ft)	DLV11-J null modem cable 10-pin to (F) RS232	DLV11-J	BC20N-05
7.62 m (25 ft)	10-pin AMP to 40-pin Berg	TU58 (UNIBUS)	BC20Y-25
1.52 m (5 ft)	10-pin Berg to RS232 male null modem	DLV11-J	BC21B-05
7.62 m (25 ft)			BC21B-25
3.05 m (10 ft)	EIA terminal/printer cable RS232 to 9-pin	MNC11	BC21C-10
4.57 m (15 ft)	RS170 monitor cable, BNC to 5-pin molex connector	RS170	BC21V-15

¹ see product description page

Digital BC-Type Cable Index (Cont.)

Length	Description	Where Used	Order Code
3.05 m (10 ft)	Shielded I/O cable replaces 70-12122	RL01/RL02	BC21Z-10
-	Replaced by BC22D	VT100, LA series	BC22A
-	Replaced by BC22E	DF01, 2, or 3	BC22B
-	Fully shielded null modem female, RS232 connectors	Null modem	BC22D.*
-	Fully shielded 16-conductor modem cable	DMF32, DF01, 2, 3	BC22E.*
-	Fully shielded 25-conductor (1)M (1)F, RS232 connectors	DMF32	BC22F.*
3.05 m (10 ft) 7.62 m (25 ft) 15.24 m (50 ft) 30.48 m (100 ft)	25-pin female RS232 to 10-pin Berg (3-TWP)	DLV1J	BC24C-10 BC24C-25 BC24C-50 BC24C-A0
Systems (PDS)			BC24J,K,L, M,N,P,R,S, T,U,V,W,X,Y
-	Obsolete	LP05K, LSP25, 26	BC24Z
.30 m (1 ft)	Y cable (1)F RS232 to (1) M + (1)F RS232	VK100	BC26B-01
-	Cables for Power Distribution Systems (PDS)	H7224	BC26D,E
.66 m (2.17 ft)	37-pin 90° angle to 25-pin (M) RS232	VT18X, VT180	BC26K-2B
7.62 m (25 ft) 15.24 m (50 ft)	DPV11 modem cable 40-pin Berg to male RS232	DPV11	BC26L-25 BC26L-50
1.52 m (5 ft) 3.05 m (10 ft) 7.62 m (25 ft)	75 ohm coaxial 3-conductor male, (3) BNC connectors on both sides	VK100 to color monitor	BC26M-05 BC26M-10 BC26M-25
.86 m (2.83 ft) 3.05 m (10 ft)	37-pin 90° angle male to 25-pin right angle male	VT278 to RX278	BC26N-2L BC26N-10
1.52 m (5 ft) 1.83 m (6 ft) 85 m (2.8 ft) 1.16 m (3.8 ft)	Quad floppy Y cable 37-pin male to (2) male 25-pin RS232 connectors	VT278 to (2) RX278	BC26P-YA BC26P-YB
.91 m (3 ft) 1.52 m (5 ft) 4.57 m (15 ft) 7.62 m (25 ft) 15.24 m (50 ft) 30.48 m (100 ft)	Modem cable (1) 25-pin 90°F RS232 to str (M) RS232	VT278	BC26R-03 BC26R-05 BC26R-15 BC26R-25 BC26R-50 BC26R-A0
1.52 m (5 ft) 4.57 m (15 ft) 7.62 m (25 ft) 15.24 m (50 ft) 30.48 m (100 ft)	Null modem (2)F 90° RS232 connectors	VT278	BC26S-05 BC26S-15 BC26S-25 BC26S-50 BC26S-A0
-	SI cable shielded coaxial	RA80, 60, 81	BC26V ¹
.23 m (.67 ft)	RS180 to RX180 (2) 25-pin 90° angle male connectors	RX180	BC26Z-0J
9.15 m (30 ft) 15.24 m (50 ft)	37-pin male D-subminiature to 50-pin male D-subminiature, 26-conductor	LP25, LP26 LP32	BC27A-30 BC27A-50
9.15 m (30 ft) 15.24 m (50 ft)	37-pin male D-subminiature to winchester connector, 26-conductors	LP07, LP32	BC27B-30 BC27B-50
.53 m (1.67 ft)	H8030 to 34 terminal strip, twisted pair	ICS11/8	BC40H-1J
.53 m (1.67 ft)	Analog cable to BC40H	ICS11/8, ICS-X	BC40K-1J
2.74 m (9 ft)	Cable assembly to TU58	11/44	BC44D-09
3.05 m (10 ft)	Integral modem cable panel cable (obsolete)	DMR11-AC, DMP11-AC	BC55A-10
3.05 m (10 ft)	RS422 EIA cable (obsolete)	DMR11-AE, DMP11-AE	BC55B-10
3.05 m (10 ft)	RS232/423 cable assembly (obsolete)	DMR11-AA, DMP11-AA	BC55C-10
7.62 m (25 ft) 15.24 m (50 ft) 22.86 m (75 ft) 30.48 m (100 ft) 76.22 m (250 ft) 152.43 m (500 ft) 304.87 m (1000 ft)	Upgraded BC55M with new metal BNC type connectors	DMR11-CP or FP DMP11-CP or FP	BC55S-25 BC55S-50 BC55S-75 BC55S-A0 BC55S-B5 BC55S-E0 BC55S-L0
7.62 m (25 ft) 15.24 m (50 ft) 22.86 m (75 ft) 30.48 m (100 ft) 76.22 m (250 ft) 152.43 m (500 ft) 304.87 m (1000 ft)	Upgraded BC55N with new metal BNC type connectors	DMR11-CP or FP DMP11-CP or FP	BC55T-25 BC55T-50 BC55T-75 BC55T-A0 BC55T-B5 BC55T-E0 BC55T-L0

¹See product description page

Digital BC-Type Cable Index (Cont.)

Length	Description	Where Used	Order Code
.61 m (2 ft)	Triax adapter cable male BNC to female CPC allows backward compatibility of BC55M/55S	BC55M, DMR11 DMP11	BC56A-02
.61 m (2 ft)	Triax adapter cable male BNC to male CPC (Amp type 4)	BC55M DMR11, DMP11	BC56B-02
.61 m (2 ft)	Twinax adapter cable male BNC to female CPC allows backward compatibility of BC55N/55T	BC55N DMR11 DMP11	BC56D-02
.61 m (2 ft)	Twinax adapter cable male BNC to male CPC	BC55N DMR11 DMP11	BC56E-02
.48 m (1'7" ft) 1.75 m 7.62 m (25 ft)	37-pin male subminiature to 25-pin male D-subminiature, 18 conductor	VT78 to RX78	BC80D-1H BC80D BC80D-25
7.62 m (25 ft)	50-pin male D-subminiature to 50-pin Berg	VT78 to LQP01	BC80F-25
6.10 m (20 ft)	40-pin ZIF to H854 (13-TWP)	RL01 to RL8-A	BC80J-20
3.66 m (12 ft) 7.62 m (25 ft)	Interface cable from RLV21 to RL01, 40-pin ZIF to H854 shielded (13-TWP)	RLV12 to RL01 or RL02	BC80M/KG-12 BC80M/KG-25
.76 m (2.5 ft) 1.83 m (6 ft)	P.C. black and white monitor cable	PC100-350	BCC02-2E BCC02-06
1.83 m (6 ft)	P.C. color monitor cable	PC278-350, VT241	BCC03-06
-	P.C. modem cable (PC100 Printer)	PC100-350, VT200 Series	BCC04-14
-	P.C. printer/null modem cable	PC278-PC350, VT200 Series	BCC05- ¹
4.57 m (15 ft)	P.C. Ethernet transceiver cable	PC350-380	BCC06-15
1.83 m (6 ft)	RX02 cable for PC278	PC278	BCC13-06
1.83 m (6 ft)	Color monitor cable	PC100	BCC17-06
4.57 m (15 ft)	LVP16 cable for PC100	PC100	BCC19-15
3.05 m (10 ft) 7.62 m (25 ft) 15.24 m (50 ft) 30.48 m (100 ft)	LVP16 cable for PC278-350	PC278-350 VT200 Series	BCC20-10 BCC20-25 BCC20-50 BCC20-A0
1.53 m (5 ft)	Drop cable LVP16	Serial Printers	BCC24-05
13.12 m (4 ft)	Instrument bus cable IEEE-488 both ends	IBV11	BN01A-04
13.12 m (4 ft)	H877 to instrument bus connector	IBV11	BN11A-04
	General purpose fiber optic cable	DEREP	BN25B
7.62 m (25 ft)	EIA module to RS232 (M)	VT50	BN50A-7F
7.62 m (25 ft)	EIA module to RS232 (M)	VT52, VT55	BN52A-7F
7.62 m (25 ft)	20 mA current loop cable to Mate-n-lok	VT52, VT55	BN52B-7F
7.62 m (25 ft)	20 mA current loop to 283B plug	VT61	BN61C-7F
-	CI cable assemblies	VT61	BNCIA- ¹
-	Ethernet coaxial cable	H4000	BNE2A, 2B- ¹
-	Ethernet transceiver cables	H4000, DELNI	BNE3A, B, C, D- ¹
-	Null modem device for async and sync communications lines used with EIA RS232 cables	BC05D BC01R	H312-A
-	EIA interface option with 9 ft cable	LA35, 36	LAXX-KG
-	EIA half/full duplex option with modem control and 9 foot cable	LA35, 36	-LG
-	20 mA Mate-n-lok cable assembly with 15 foot cable	LA35, 36	-LH
-	Serial interface, 256 character buffer, EIA	LA180	-NW
-	Serial interface, 256 character buffer, 20 mA	LA180	-NX
-	EIA interface option with 9 foot cable	LA35, 36	LAXX-KG
-	EIA half/full duplex option with modem control and 9 foot cable	LA35, 36	-LG
-	20 mA Mate-n-lok cable assembly with 15 foot cable	LA35, 36	-LH
-	Serial interface, 256 character buffer, EIA	LA180	-NW
-	Serial interface, 256 character buffer, 20 mA	LA180	-NX
1.83 m (6 ft)	Remote power control cable conductor, Mate-n-lok	861 Series 871 Series H9642 Series	70-08288-06
.69 m (2.25 ft) 1.22 m (4 ft)	Replaced by BC05M-2C Replaced by BC05M-04	DL11-WA 20 mA Interfaces	70-08360-00 70-08360-01

¹ see product description page

Digital BC-Type Cable Index (Cont.)

Length	Description	Where Used	Order Code
.10 m (.33 ft)	Keyboard cable 16-conductor flat ribbon	LA36	70-08612-0D
.23 m (.75 ft)			70-08612-0K
.28 m (.92 ft)			70-08612-0M
.35 m (1.17 ft)			70-08612-1B
.46 m (1.50 ft)		PDP-8	70-08612-1F
1.25 m (4.08 ft)		LA36	70-08612-4A
1.85 m (6.08 ft)		BA11-M	70-08612-6A
-	40-pin Berg to winchester LP11 interface cable	LP11 Family	70-11212
4.87 m (15 ft)	40-pin Berg to winchester 24-TWP	CR11 Series Card Readers & Interfaces	70-11217-15
18.29 (60 ft)			70-11217-60
30.48 (100 ft)			70-11217-A0
.81 m (2.67 ft)	10-conductor flat ribbon with (2) 10 position 2 x 5 connectors console to backplane cable	KY11-LB	70-11411-2J
-	Replaced by BC21Z		70-12122
9.14 m (30 ft)	40-pin Berg to 50-pin D-subminiature 26-conductor TWP 28-AWG	LP25	70-16560-30
15.24 m (50 ft)		LP26	70-16560-50
30.48 m (100 ft)			70-16560-A0
7.62 m (25 ft)	M9700 to RS232 male, 25-conductor	DC11-D, DVS11	BC01R-25
15.24 m (50 ft)			BC01R-50
7.62 m (25 ft)	Bell 303 series modem H856 to Burndy	DP8-EB, DQ11 DQS11	BC01W-25
15.24 m (50 ft)			BC01W-50
.41 m (1.33 ft)	H855 to 12-13039 cable extender, 40 wires	DWP11	BC02C-1D
-	Order BC05W Page 31		BC02D
1.52 m (5 ft)	M901 to M901, 19-conductor dual mylar cable	DVS11 LA36	BC03H-05
.53 m (1.75 ft)	H856 to filtered RS232-C male, 15-conductors	PDP-8-E	BC03L-1K
1.52 m (5 ft)		11/03	BC03L-05
3.05 m (10 ft)		11/23B	BC03L-10
		11/780/WS200	
-	RS232 female both ends, 6-conductor (3-TWP) null modem	11/34, 11/70	BC03M-1
		PDP-8-E/11	
7.62 m (25 ft)	4-pin Amp coaxial	DMC11-M	BC03N-25
15.24 m (50 ft)			BC03N-50
30.48 m (100 ft)			BC03N-A0
45.72 m (150 ft)			BC03N-A5
3.05 m (10 ft)	Male Mate-n-lok to (4) terminal rings	KSR 33/35 for PDP-8E DZ11-C,D	BC04R-10
3.66 m (12 ft)			BC04R-12
5.49 m (18 ft)			BC04R-18
7.62 m (25 ft)			BC04R-25
15.24 m (50 ft)			BC04R-50
22.86 m (75 ft)			BC04R-75
60.98 m (200 ft)			BC04R-B0
1.83 m (6 ft)	H856 to 40-conductor, flat ribbon cable	Interface kits	BC04Z-06
3.05 m (10 ft)			BC04Z-10
4.57 m (15 ft)			BC04Z-15
7.62 m (25 ft)			BC04Z-25
1.52 m (5 ft)	H856 to RS232 male 25-conductor	Serial line interface	BC05C-05
2.74 m (9 ft)			BC05C-09
3.05 m (10 ft)			BC05C-10
7.62 m (25 ft)			BC05C-25
10.67 m (35 ft)			BC05C-35
15.24 m (50 ft)			BC05C-50
21.34 m (70 ft)			BC05C-70
-	Replaced by BC22F page 15	EIA extension	BC05D
4.57 m (15 ft)	20 mA terminal cable, male to male Mate-n-lok, wired 7-5, 5-7, 3-2, 2-3, 4 connector.	VT1XX-AA	BC05F-15
15.24 m (50 ft)		LA12X-AL	BC05F-50
30.48 m (100 ft)		LA35, LA36	BC05F-A0
60.98 m (200 ft)		KL10 VT1XX-CA	BC05F-B0
1.83 m (6 ft)	Line cord to H400-A, 120 Volt, 7 AMP	H740-D, TM03	BC05H-06
1.83 m (6 ft)	Line cord to H400-B 230 Volt, 4 AMP	H740-D, TM03	BC05J-06
-	40-conductor flat ribbon cable	BCV1A, B	BC05L-*
1.22 m (4 ft)	20 mA interface cable	DL11	BC05M-04
1.52 m (5 ft)			BC05M-05
3.05 m (10 ft)			BC05M-10
4.57 m (15 ft)			BC05M-15
.45 m (1.5 ft)			BC05M-1F
6.10 m (20 ft)			BC05M-20
7.62 m (25 ft)			BC05M-25
.7 m (2.25 ft)			BC05M-2C
15.24 m (50 ft)			BC05M-50
30.48 m (100 ft)			BC05M-A0
3.05 m (10 ft)	LP5VC to VR14, VR20	VR14, VR20	BC05N-10
-	50-conductor, flat ribbon shielded signal cable	DZ11, Multi-use	BC05W-*

Digital BC-Type Cable Index (Cont.)

Length	Description	Where Used	Order Code
4.57 m (15 ft)	20 mA extension cable, (1) female and (1) male Mate-n-lok connector	BC05F	BC05X-15
7.62 m (25 ft)			BC05X-25
15.24 m (50 ft)			BC05X-50
30.48 m (100 ft)			BC05X-A0
121.95 m (400 ft)			BC05X-D0
7.62 m (25 ft)	H856 to V.35	DMC11-FA	BC05Z-25
15.24 m (50 ft)			BC05Z-50
7.62m (25 ft)	H885 to H885, mirror connections (A to B, etc.)	H7004-B 11/03	BC06R-25
		DRV11-D DS310	
.22 m (9" ft)	50-conductor mirror image ribbon cable	H7004-C	BC06L-0J
1.52 m (5 ft)		DRV11JA LQP8E	BC06L-05
-	Internal MASSBUS cable, general purpose I/O	RH controllers	BC06R- ¹

¹ see product description page

Product Category	Product(s) You Have	Connections Used On	Cable You Need
Cables	BC05M and BC05F	20 mA Current Loop Interface	BC05X
		EIA Extension	BC22F
Communication Options	DN11-DA, DLV11, DL11-IB/D/E, DP8-EA, DS10, DS11-BA	EIA Serial Line Interface	BC05C
	DZ11-A, DZ11-E	EIA Modem	BC22F
	DZ11-A, DZ11-E	EIA Null Modem	BC03M or BC22D
	DZ11-C, DZ11-F	20 mA Interface	BC04R or BC04S
	DLV11-J, MXV11	EIA Serial Line Interface	BC20N, BC24C or BC21B
	DMR11-AC, DMV11-AC, DMP11-AC	Networking Cables	BC55M or BC55N
	DL11-WA, KL8-E, DLV11-FA	20 mA Serial Line Interface Modules	BC05M
	DMF32	External Asynchronous Modems	BC22E
	DMF32	Local EIA Terminals	BC22D
	DMF32	Synchronous Line	BC22F
Mass Bus Devices	RL11 Internal Massbus Interconnections	RL01, RL02, RH11, RH70, RH780	BC06R
	RM02, RM03, RP04, RP06, RP07, RM05, TU78	Mass Bus Controller to Drives	BC06Z
Bus Expansion Devices	BA11-ME, BA11-NE	Expansion Boxes (BA11 to BA11)	LSI Only BCV1A
	BA11-ME, BA11-NE	LSI C.P.U.'s 11/02, 11/03, 11/23, (CPU to BA11)	BCV1B
	UNIBUS Backplane or Expansion Box	PDP-11 Interconnect	BC11A

Product Category	Product(s) You Have	Connections Used On	Cable You Need
Line Printers	LP02, LP04, LP05, LP06, LP07, LP14, LXY01, LXY02	Contollers for Printers LPV11	LP11, 70-11212
	LP02, LP04, LP05, LP06, LP07, LP14, LXY01, LXY02	Long Line Kits, LSP25, LSP26	BN27C
	LP25, LP26	Contollers for Printers LPV11	LP11, 70-16560
Personal Computers	Professional 350, Rainbow 100 DECmate II	EIA Modem	BCC04/14
	Professional 350 Rainbow 100. DECmate II	EIA Null Modem Printer (LQP02)	BCC05
Printer Terminals	LA12, LA34, LA35, LA36, LA38, LA50, LA100, LA120	EIA Null Modem	BC03M or BC22D
	LA12, LA34, LA35, LA36, LA38, LA50, LA100, LA120	EIA Modem	BC22E or BC22F
	LA180	Contollers for Printers LPV11	LA11, BC11S
	LQP02	EIA Null Modem	BC03M or BC22D
Video Terminals	VT52, VT55	EIA Null Modem or Modem	BN52A
	VT52, VT55	20 mA Interface	BN52B
	VT100, VT101, VT102, VT125	Null Modem	BC03M or BC22D
	VT100, VT101, VT102, VT125	Modem	BC22E or BC22F
	VT278	EIA Modem	BC26R
	VT278	Letter Quality Printer	LQP02 BC26S
	VT278	LA100, 120, 34, 38	BC26S
	VT100, VT101, VT102, VT125	To a Printer Terminal	BC22D

Introduction

Long established as a leader in the manufacture of computer systems, Digital now sets the standard for the design and manufacture of storage systems with its Digital Storage Architecture (DSA).

The DSA is a framework for an expanding group of mass storage products and intelligent controllers. DSA includes several sets of products, each of which is compatible within itself, but not with other families. Any drive can be connected to any controller port, and drives can be mixed on the same controller. The drives are all dual-ported and can be connected on both HSC and UDA ports. The DSA disk drives include the 121-Mbyte RA80 and 456-Mbyte RA81 Winchester fixed disks and the 205-Mbyte RA60 removable-media disk. Any combination of up to three of these disks requires only one 106.6-centimeter (42-inch) high cabinet yielding maximum storage capacity and space efficiency.

Also available for VAX computers are MASSBUS disk subsystems. See the MASSBUS adapters discussion.

For long term data backup storage, Digital offers high-quality 9-track magnetic tape drives featuring industry standard 6250 bits per inch, 1600 bits per inch, and 800 bits per inch formats. Digital's start/stop and streaming tape technology features 1600 bits per inch and 6250 bits per inch industry standard formats.

Digital Storage Architecture (DSA) is a new approach to storage system design. A carefully planned framework of standardized interfaces permits the addition of new products incorporating new technologies to host systems without the need to develop additional specialized controllers or software drivers. The architecture definition provides a new standard for data integrity, I/O throughput, systems availability and maintainability features which is incorporated in each of the DSA components and subsystems. The new DSA product components include the high-density, removable-media RA60, fixed/removable RC25 and the high-density RA81 and RA80 Winchester together with the UDA50 (UNIBUS Disk Adapter) and HSC50 (Hierarchical Storage Controller).

The major features common to the DSA disk products, are as follows:

I/O Throughput

- Seek Ordering – reorders and executes requests by cylinder address closest to read/write heads, thereby improving the effective I/O access time
- Overlapped Seeking – transfers data from one disk while simultaneously seeking to all disks
- Rotational Optimization – selects the disk nearest to the beginning sector when more than one disk is positioned on cylinder
- Express Queue – provides immediate servicing of I/O requests if required
- Speed Matching Buffers – use of high speed RAM to smooth the disk data burst rates to the host CPU I/O bus

Data Integrity Features

- 170-bit Error Correction Code (ECC) – Detects and corrects up to eight independent 10-bit error bursts, reducing the possibility of uncorrected data errors that result from media degradation.
- Redundant Header Addresses – Records disk block header information four times for more reliable data retrieval.
- Automatic Sector Reallocation – Automatically removes defective blocks from service, and replaces them with others, without causing shrinkage in usable space.
- Error Detection Code – Checks controller memory and data path errors as well as ECC hardware operations.
- Error Reporting – All errors are reported to the host system, enabling detection and preventive action before subsystem failure.

Product Information

The HSC50 is a computer-interconnect-based intelligent disk controller that offers full architectural support and performance optimization for as many as 24 SDI RA80, RA81, and RA60 disk drives.

The HSC50 can serve several CI-bus interconnected host processors. It is housed in a stand-alone cabinet, is independently powered, and electrically isolated from the CPUs and drives that it serves. It provides high performance I/O throughput using a PDP-11 based microprocessor in conjunction with multiple, high-speed bit slice microprocessors.

The HSC50 server off-loads all disk management functions from the host systems and provides host-independent sharing of common data among a network of locally connected VAX-11/750 and larger processors. Its internal high speed bus structure permits simultaneous read or write operation to multiple disk drives and a sustained I/O throughput rate as high as 4 Mbytes per second.

In addition the HSC50 provides these capabilities:

- Command Queue—stores over 1000 host I/O requests for disk and other optimizations,
- Data Buffering—provides the buffering of as many as 128 Kbytes of data (256 disk sectors to insulate the CI bus from realtime dependency),
- Self-contained Diagnostics—provides host-independency diagnostic and maintenance,
- Off-line Utilities—happening in parallel and providing volume back-up and restore as well as disk formatting and format verification,
- High Availability—disks can be dual ported to multiple HSC50s for high availability, and
- Multiple processors may read and write shared files.

Performance Specifications

- CI bus bandwidth: 2-4 Mbytes per second,
- Disk data-channel bandwidth: 3.125 Mbytes per second maximum each, and
- Internal Data Bus: 13.3 Mbytes per second total.

HSC50 Order Codes

Option	Order Code
HSC50 with space for six HSC5X-BA. Cables not included.	HSC50-AB
Data channel interface for interfacing as many as four disk drives.	HSC5X-BA
Second power supply for more than three HSC5X-BA on the HSC50.	HSC5X-EB
Data channel for interfacing as many as four DSA tape formatters.	HSC5X-CA

Product Information

The UDA50 controller implements the Digital Storage Architecture (DSA) and allows DSA disk drives to be used with a variety of UNIBUS system configurations. The UDA50 is an intelligent controller containing two high-speed microprocessors for host and disk communication as well as data routing in and out of the on-board memory buffers. The UDA's advanced design permits the controller to handle disk data rates up to 3 Mbytes per second. The controller consists of two Hex modules that can be inserted into any two adjacent UNIBUS slots. Each controller can attach up to four SDI disk drives in any combination of RA80, RA81, and RA60. A maximum of two UDA50 controllers can be used per VAX UNIBUS (see system building block descriptions). On both VAX and PDP-11 units the controller provides the following additional capability:

- Command Queue—stores up to 20 host I/O requests for disk seek optimization.
- Speed Matching Buffer—provides the buffering of up to 52 disk sectors in order to smooth the data rates between the high-speed disks and the host UNIBUS port.
- DMA Transfer—allows direct controller-to-host memory transfers.
- On-Board Diagnostics—indicates fault conditions on LED displays and in a hardware register that is readable by the host.
- Last Fault Register—aids subsystem troubleshooting by logging the last fault in an error register.

UDA50 Order Codes

Option		Order Code				
Additional UDA50 controller with one BC26V-12 cable.		RUA80-UD				
Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
RUA80	2 Hex Slots	12.0	0.04	1.30	1.0	1

Product Information

The RQDX1 controller is used to interface the 11-Mbyte RD51, and 31-Mbyte RD52 Winchester disk drives, and the 0.8-Mbyte RX50 dual diskette drives to Q-bus systems. Data is transferred to the host system via efficient block-mode DMA. The RQDX1 is an intelligent controller with an onboard microprocessor. Programs in the host system communicate with the controller and drives using the Mass Storage Control Protocol (MSCP) of the Digital Storage Architecture. MSCP and the RQDX1 include features to enhance system throughput, ensure data integrity, and increase subsystem availability.

The RQDX1 is a standard feature of MicroPDP-11 systems. It can be added to other Q-bus systems in conjunction with RD-type (RD51 and RD52) and RX50 mass storage devices. Refer to the *Mass Storage Unit Configuration* chart for all allowable examples of add-on disk configurations.

When supporting internal drives on the MicroPDP-11 or MicroVAX I, the RQDX1 does not use a panel insert.

RQDX1 Order Codes

Option	Order Code
RQDX1 for use in the (MicroPDP-11, MicroVAX I, or MicroVAX II) BA23 box	RQDX1 CK-RQDX1-KA
RQDX1 for use with (PDP-11/23-PLUS) H349 panel.	RQDX1 CK-RQDX1-KC
Double height disk drive bus extender module for use with the RQDX1 disk controller.	RQDX1-E

Product Information

The RUX50 is a quad-size UNIBUS single-board PDP-11 controller and will interface to as many as two 0.8-Mbyte RX50 dual diskette drives. Data is transferred to the host system via DMA. The RUX50 is an intelligent controller with an onboard T-11 microprocessor. Programs in the host system communicate with the controller and drives using the Mass Storage Controller Protocol (MSCP) of the Digital Storage Architecture. MSCP and the RUX50 include features to enhance system throughput, ensure data integrity, and increase subsystem availability.

An RUX50 can be added to a PDP-11 UNIBUS system in conjunction with other mass storage devices.

RUX50 Order Codes

Option	Order Code
UNIBUS controller for RX50	RUX50-YA
UNIBUS controller for RX50 system option	RUX50-YP

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+5V	+15V	-15V	AC	DC	
RUX50	1 Quad Slot	3.0	0.7	0.0	N/A	N/A	1



Product Information

The RA80 disk uses Winchester technology to provide 121 Mbytes of formatted storage in a 26.6-centimeter (10.5-inch) high package. The RA80's high recording density and high reliability are a result of an advanced mechanical design that incorporates a rotary positioner-motor, computer designed positioner arms, and lightweight Winchester head suspension. The RA80 operates with the UDA50 UNIBUS controller.

The RA80 standalone unit comes in the top bay of a 91.4-centimeter (36-inch) deep cabinet. Two additional drives (RA80s, RA81s, and RA60s in any combination) can be mounted in the middle and bottom cabinet bays.

The RA80-AD rackmountable drive can be added to the older H9642-BN shallow cabinet.

One BC26V 3.7-meter (12-foot) cable is included with every drive or subsystem to connect the RA80 to a UDA50 controller. If you need a longer cable, or if you want your RA80 dual-ported to another controller, order the appropriate cable length from the following table.

The dynamic (simultaneous access) dual-port capability of disk subsystems is not supported by diagnostics. However, subsystems can be statistically shared by two processors or connected to one processor through two controllers for maximum system availability.

Performance Characteristics

- Formatted capacity per drive: 121 MBytes
- Peak transfer rate: 1.2 MBytes/s
- Average access time: 33.3 msec
- Average seek time: 25 msec
- Average latency time: 8.33 msec
- Dual-port option: Standard
- Media surfaces: 7 data, 1 servo
- Physical tracks per surface: 1,092
- Sectors per track: 31 (16-bit words)
- Single-track seek: 6 msec
- Rotational speed: 3600 rpm

Expansion Specifications

- Drives per UDA50 controller: 4
- Drives per HSC5X-BA interface: 4
- Drives per HSC50: 24
- Drives per H9642 cabinet: 3

RA80 Order Codes

Option	Order Code
Subsystems	
RA80 rackmountable disk drive with a UDA50 controller.	RUA80-AD
RA80 disk drive mounted in an H9642-AR cabinet with a UDA50 controller.	RUA80-CD
RA80 disk drive mounted in an H9642-AR cabinet with two UDA50 controllers.	RUA80-JD
Disk Drives	
RA80 rackmountable disk drive.	
<i>Prerequisite:</i> UDA50 controller and a cabinet for mounting.	RA80-AD
RA80 disk drive mounted in a cabinet.	
<i>Prerequisite:</i> UDA50 controller.	RA80-CD
Additional Controller	
UDA50 controller for dual-porting RA80, RA81, and RA60 disks (contains one BC26V-12 cable).	
<i>Prerequisite:</i> RUA81-CD, RUA80-CD	RUA80-UD

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
RUA80	2 Hex Slots	12.75	0.04	1.30	1.0	1

Option	Length	Where Used
BC26V-12	3.7m (12 ft)	Connects one RA81, RA80 or RA60 disk drive to an existing UDA50 controller or HSC50 storage system.
BC26V-25	7.6m (25 ft)	
BC26V-50	15.2m (50 ft)	
BC26V-80	24.4m (80 ft)	



Product Information

The RA81 is a high-capacity, rackmounted Winchester disk with a recording density of nearly 12 Mbits per square inch, to provide a formatted capacity of 456 Mbytes. The RA81's high capacity is achieved through innovative engineering in the read/write and positioner control systems. The read/write system employs an encoding/decoding scheme that yields one-third more storage capacity than drives using conventional encoding. Position information on a dedicated servo surface enables high-speed seeking. Additional position information is embedded between sectors on every track for high-precision positioning. The RA81 operates with the high-performance UDA50 UNIBUS controller.

The RA81 features outstanding data reliability characteristics including an industry-leading 170-bit error correction code (ECC) and over 17,000 spare sectors for dynamic defect compensation. A low-cost three-drive configuration providing almost 1.4 gigabytes of formatted storage is offered, requiring only 1.68 meters² (5.5 square feet) of floor space.

The RA81 standalone unit comes in the top bay of a 91.4-centimeter (36-inch) deep cabinet. Two additional drives (RA80s, RA81s, or RA60s in any combination) can be mounted in the middle and bottom cabinet bays.

The RA81-AD rackmountable drive can be added to the older H9642-BN shallow cabinet.

One BC26V 3.7-meter (12-foot) cable is included with every drive or subsystem to connect the RA81 to a UDA50 controller. If you need a longer cable, or if you want your RA81 dual-ported to another controller, order the appropriate cable length from the following table.

The dynamic (simultaneous access) dual-port capability of disk subsystems is not supported by diagnostics. However, subsystems can be statistically shared by two processors or connected to one processor through two controllers for maximum system availability.

Performance Characteristics

- Formatted capacity per drive: 456 MBytes
- Peak transfer rate: 2.2 Mbits/s
- Average access time: 36.3 msec
- Average seek time: 28 msec
- Average latency time: 8.33 msec
- Dual-port option: Standard
- Media surfaces: 7 data, 1 servo
- Tracks per surface: 2,496
- Sectors per track: 51
- Bytes per sector: 512
- Track-track seek: 6 msec
- Rotational speed: 3,600 rpm

Expansion Specifications

- Drives per UDA50 controller: 4
- Drives per HSC5X-BA interface: 4
- Drives per HSC50: 24
- Drives per H9642 cabinet: 3

RA81 Order Codes

Option	Order Code
Subsystems	
RA81 rackmountable drive with a UDA50 controller.	RUA81-AD
RA81 disk drive mounted in an H9642-AR cabinet with a UDA50 controller.	RUA81-CD
Three RA81 disk drives in an H9642-AR cabinet with a UDA50 controller.	RUA81-ED
RA81 disk drive mounted in an H9642-AR cabinet with two UDA50 controllers.	RUA81-JD
Disk Drives	
RA81 rackmountable disk drive.	
<i>Prerequisite:</i> UDA50 controller and an H9642-AR cabinet for mounting.	RA81-AD
RA81 disk drive mounted in an H9642-AR cabinet.	
<i>Prerequisite:</i> UDA50 controller.	RA81-CD
Three RA81 disk drives mounted in an H9642-AR cabinet.	
<i>Prerequisite:</i> UDA50 controller.	RA81-ED
Additional Controller	
UDA50 controller for dual-porting RA81, RA80, and RA60 disks (contains one BC26V-12 cable).	
<i>Prerequisite:</i> RUA81-CD, RUA60-CD, or RUA80-CD.	RUA80-UD

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
RUA81	2 Hex Slots	12.75	0.04	1.30	1.0	1

Option	Length	Where Used
BC26V-12	3.7m (12 ft)	Connects one RA81, RA80 or RA60 disk drive to an existing UDA50 controller or HSC50 storage system.
BC26V-25	7.6m (25 ft)	
BC26V-50	15.2m (50 ft)	
BC26V-80	24.4m (80 ft)	

Product Information

The RA60 is a high-capacity, rackmountable, removable-media disk providing 205 Mbytes of formatted capacity. The recording density is three times that of similar sized capacity disks. Its high density combined with its low purchase price and its low cost of maintenance means that the RA60 offers the lowest life-time cost of ownership per Mbyte of any removable-media disk drive in the industry. The RA60 operates with the high-performance UDA50 UNIBUS controller.

The RA60 disk drive uses advanced embedded servo technology to eliminate the need for alignments. It also incorporates new recording methods, microprocessor-controlled diagnostics, a 170-bit error correcting code, and modular design for easy maintenance. In addition, the RA60 media format provides over 9,000 spare sectors for dynamic defect reallocation to give the user effective, defect-free, contiguous media. The RA60 disk packs can be interchanged among RA60 drives without restriction or degradation of data reliability. RA60 cylinders are organized horizontally in sets of four tracks, to minimize the delay on multi-sector transfers that cross track boundaries.

The RA60 standalone unit comes in the top bay of a 91.4-centimeter (36-inch) deep cabinet. Two additional drives (RA80s, RA81s, and RA60s in any combination) can be mounted in the middle and bottom cabinet bays.

One BC26V 3.7-meter (12-foot) cable is included with every drive or subsystem to connect the RA60 to a UDA50 controller. If you need a longer cable, or if you want your RA60 dual-ported to another system, order the appropriate cable length from the following table.

The dynamic (simultaneous access) dual-port capability of disk subsystems is not supported by diagnostics. However, subsystems can be statistically shared by two processors or connected to one processor through two controllers for maximum system availability.

Performance Characteristics

- Formatted capacity per drive: 205 MBytes
- Peak transfer rate: 1.98 MBits/s
- Average access time: 50 msec
- Average seek time: 41.7 msec
- Average latency time: 8.33 msec
- Dual-port option: Standard
- Media surfaces: 10 (6 data, 4 protective)
- Tracks per surface: 1,600
- Sectors per track: 43 (16-bit words)
- Bytes per sector: 512
- Track-track seek: 6.7 msec
- Rotational speed: 3,600 rpm

Expansion Specifications

- Drives per UDA50 controller: 4
- Drives per HSC5X-BA interface: 4
- Drives per HSC50: 24
- Drives per H9642-AR cabinet: 3

RA60 Order Codes

Option

Order Code

Subsystems

RA60 rackmountable drive with a UDA50 controller. RUA60-AA

RA60 disk drive mounted in an H9642-AR cabinet and a UDA50 controller. RUA60-CD

RA60 disk drive mounted in an H9642-AR cabinet and two UDA50 controllers. RUA60-JD

Disk Drives

RA60 disk drive mounted in an H9642-AR cabinet.
Prerequisite: UDA50 controller. RA60-CD

RA60 rackmountable disk drive with no cabinet.
Prerequisite: H9642-AR cabinet and a UDA50 controller. RA60-AA

Additional Controller

UDA50 controller for dual-porting RA81, RA80, and RA60 disks (contains one BC26V-12 cable).
Prerequisite: RUA80-CD, RUA81-CD or RUA60-CD. RUA80-UD

Option Mounting Requirements

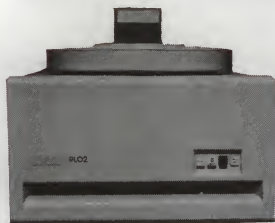
Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
RUA60	2 Hex Slots	12.75	0.04	1.30	1.0	1

Option	Length	Where Used
BC26V-12	3.7m (12 ft)	Connects one RA81, RA80 or RA60 disk drive to an existing UDA50 controller or HSC50 storage system.
BC26V-25	7.6m (25 ft)	
BC26V-50	15.2m (50 ft)	
BC26V-80	24.4m (80 ft)	

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
RA60-AA	²	240	50-60	1	3.7	703	2532	6-15R	26.7	48.3	85.1	75
RA60-AA	²	240	50-60	1	3.7	703	[2400]	6-15R	[10.5]	[19.0]	[33.5]	[165.0]
RA60-CD	^{1 2}	240	50-60	1	3.7	703	2532	6-15R	105.9	54.0	91.4	168
RA60-CD	^{1 2}	240	50-60	1	3.7	703	[2400]	6-15R	[41.7]	[21.3]	[36.0]	[370.0]
RA80-AD	²	240	50	1	3.4	645	2321	6-15R	26.7	48.3	67.3	67.3
RA80-AD	²	240	50	1	3.4	645	2200	6-15R	[10.5]	[19.0]	[26.5]	[148.0]
RA80-CD	^{1 2}	240	50	1	3.4	645	2321	6-15R	105.9	54.0	91.4	165
RA80-CD	^{1 2}	240	50	1	3.4	645	[2200]	6-15R	[41.7]	[21.3]	[36.0]	[363.0]
RA81-AD	²	240	50	1	3.4	645	2321	6-15R	26.7	48.3	67.3	67.3
RA81-AD	²	240	50	1	3.4	645	[2200]	6-15R	[10.5]	[19.0]	[26.5]	[148.0]
RA81-CD	^{1 2}	240	50	1	3.4	645	2321	6-15R	105.9	54.0	91.4	165.0
RA81-CD	^{1 2}	240	50	1	3.4	645	[2200]	6-15R	[41.7]	[21.3]	[36.0]	[363.0]
RA81-ED	^{1 2}	240	50	1	10.2	1935	6965	6-15R	105.9	54.0	91.4	299.2
RA81-ED	^{1 2}	240	50	1	10.2	1935	[6602]	6-15R	[41.7]	[21.3]	[36.0]	[659.0]

¹ In all cabinet mounted disk products listed (except RA81-EA(ED)), the disk drive is installed in the topmost mounting location. Space is available for an additional two RA60, RA80 or RA81 drives. The RA81-EA(ED) include three RA81-AA(AD) drives.

²For product variations which include a UNIBUS Controller, e.g. RUA80-XX with UDA50 controller, the power and cooling requirements of the controller are allowed for in the expansion backplane/box data.



Product Information

The RL02 combines reliability and cartridge disk convenience in a low-cost, medium-capacity mass storage device. An embedded closed-loop servo positioning system improves data integrity by continuously sampling servo information with the same head that reads and writes the data. To further ensure data integrity, a cyclic redundancy check (CRC) is performed on data transfers between the drive and controller. Also, a phase-locked-loop clock system and modified frequency modulation (MFM) recording provide reliable reading and recording techniques. Direct memory access (DMA) is used to provide rapid data transfer and efficient utilization of the host processor.

Average access time is defined as the sum of the average seek time plus the average latency.

Performance Characteristics

- Formatted capacity per drive: 10.4 MBytes
- Peak transfer rate: 512 KBits/s
- Average access time: 67.5 msec
- Average seek time: 55 msec
- Average latency time: 12.5 msec
- Dual-port option: No
- Media surfaces: 2 data
- Tracks per surface: 512
- Sectors per track: 40
- Bytes per sector: 256
- Track-track seek: 15 msec
- Rotational speed: 2,400 rpm

Expansion Specifications

- Drives per controller: 4
- Maximum controllers per CPU: 2

RL02 Order Codes	Option	Order Code
Subsystems		
Rackmounting removable-cartridge disk drive and controller to interface to the PDP-11 UNIBUS.		RL211-AK
Rackmounting removable cartridge disk drive and controller for use with the (MicroPDP-11 or MicroVAX II) BA23 box.		RLV22-AB
Rackmounting removable cartridge disk drive and controller for use with a BA11-M (PDP-11/23-S) or a BA123 (MicroVAX II).		RSV22-AA
Rackmounting removable cartridge disk drive and controller for use with H349 (PDP-11/23-PLUS).		RLV22-AC
Controller		
The RLV12 controller interfaces one to four RL01 or RL02 disk drives to the Q-bus. I/O is DMA. The RLV12 performs a cyclic redundancy check on data and headers. Memory is parity checked, and the current command to the RLV12 is aborted when the error is detected.		RLV12-KA
For use on MicroPDP-11.		RLV12-KB
For use on PDP-11/23-B.		RLV1A-KC
Disk Drives		
Rackmount removable cartridge disk add-on drive.		RL02-AK

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
RL211-AK	1 Hex Slot	5.0	0.50	0.50	1.0	1

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation	NEMA Rec Type	Physical Size				
						Watts	BTUs/HR [KJ/HR]	Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]	
RL02-AK	¹	120		1	1.70	160	576	5-15R	26.7	48.3	63.5	34.1
RL02-AK	¹	240		1	.85	160	[546]	6-15R	[10.5]	[19.0]	25.0	[75.0]

¹For product variations which include a UNIBUS Controller, e.g., RL211-AK with RL11 controller, the power and cooling requirements of the controller are allowed for in the expansion backplane/box data.

Product Description

MASSBUS adapters are high-speed controllers for large disk drives and tape transports, performing priority arbitration among devices on the MASSBUS.

MASSBUS peripherals supported on the VAX-11/780-series are the TU77 and TU78 tapes. If an additional MBA is required, these subsystems should be ordered as TEU77 and TEU78, respectively. Each subsystem includes the mass storage device, its controller formatter, and a MASSBUS adapter with power supply.

VAX-11/780-series: MBAs are mounted in the Option Panel Spaces (OPSs) included in the VAX-11/780-series CPU cabinet and/or CPU expansion cabinet(s), depending on the particular system configuration. Each VAX-11/780-series MBA requires one Option Panel Space. VAX-11/780-series systems can accommodate up to four MASSBUS adapters.

VAX-11/750: MASSBUS peripherals supported on the VAX-11/750 are the TU77 and TU78. If an additional MBA is required, these subsystems should be ordered as TGU77 and TGU78, respectively. Each subsystem includes the mass storage device, its controller formatter and a MASSBUS adapter. VAX-11/750 MASSBUS adapters are powered by power supplies included in the CPU cabinet.

VAX-11/750: MBAs are mounted in the prepowered general purpose I/O adapter slots included in the CPU backplane. Each VAX-11/750 MBA consists of one module.

Each MBA can run up to eight tape formatters on its MASSBUS. Included with each TU77 and TU78 tape transport is a different formatter. Each formatter will accommodate up to either four or eight tape transports, depending upon the transport used.

Tape formatters are not sold alone; they are integral to all MASSBUS tape subsystems as well as to the TU78 Master option.

MASSBUS Adapter Order Code

Option	Order Code
MASSBUS Adapters are high-speed controllers for tape transports performing priority arbitration among devices on the MASSBUS. MASSBUS Adapters require one OPS. A MASSBUS Adapter (MBA) is needed when adding high-performance devices such as TU78 Master tape drives.	RH780-FB



Product Information

The RX02 double-density floppy disk drive provides an industry-compatible format and highly reliable operation. Direct memory access (DMA) is used to provide rapid data transfer and efficient utilization of the host processor. These subsystems include two RX02, 0.5-Mbyte drives (for a total of 1-Mbyte) and a controller with interconnect cabling. The dual drives are packaged as a cabinet-mountable or tabletop unit.

Average access time is defined as the sum of the average seek time plus the average settling time plus the average latency.

Performance Characteristics

- Formatted capacity per drive: 0.5 MByte (1 MByte total)
- Peak transfer rate: 61 KBits/s
- Average access time: 262 msec
- Average seek time: 154 msec
- Average settling time: 25 msec
- Average latency time: 83 msec
- Dual-port option: No
- Media surfaces: 1 data
- Tracks per surface: 77
- Sectors per track: 26
- Bytes per sector: 256
- Track-track seek: 6 msec
- Rotational speed: 360 rpm

Expansion Specifications

- Drives per controller: Two

RX02 Order Codes

Option	Order Code
Rackmount dual RX02 floppy disk drives and controller to interface to the PDP-11 UNIBUS.	RX211-BN
Dual RX02 floppy disk drive and controller for use with BA23 (MicroPDP-11 or MicroVAX II).	RXV21-ZB
Dual RX02 floppy disk drives and controller for use with BA11-M (PDP-11/23-S) or BA123 (MicroVAX II).	RXV21-ZA
Dual RX02 floppy disk drives and controller for use with H349 (PDP-11/23-PLUS).	RXV21-ZC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
RXV21	1 Dual Slot	2.2	0.0	2.0	1.0	A



Product Information

The RX50 dual diskette drive is a low-cost, compact, random access diskette drive. It stores data in fixed-length blocks on two 5 1/4-inch flexible diskettes using preformatted industry-standard headers. Since the drive can accommodate two diskettes simultaneously, one diskette can be used for system programs and the other allocated as a file device. The drive mechanism is packaged in a single compact housing, and its dimensions conform to the industry standards for 5 1/4-inch disk media.

The RX50 is available in two distinct packaging styles. The RX50-AA is intended to be "added-into" the MicroPDP-11 system enclosure. The RX50-D and RX50-R are mounted in their own separate desktop or rackmount enclosures, and "added-onto" a system, such as a PDP-11/23-PLUS or MicroPDP-11. Refer to examples of additional disk configurations.

When adding an RX50 desktop or rackmount unit to a PDP-11 UNIBUS system, you must also order an RUX50-YA controller with 2.7-meter cable.

Performance Characteristics

- Peak transfer rate: 250 KBits/s
- Average seek time: 164 msec
- Rotational latency (average): 100 msec

Media Characteristics

- Formatted capacity per diskette: 409 KBytes (818 KBytes total)
- Diskettes per drive: 2
- Recording surfaces per diskette: 1
- Bytes per sector: 512
- Sectors per track: 10
- Tracks per diskette: 80

RX50 Order Codes

Option	Order Code
0.8-Mbyte diskette drive (only).	RX50-AA
0.8-Mbyte diskette drive mounted in desktop enclosure with I/O cable.	RX50-DB
0.8-Mbyte diskette drive with controller mounted in desk-top enclosure with I/O cable for the PDP-11/23-PLUS.	RX50-DF
10-Mbyte RD51 drive and 0.8-Mbyte diskette drive with controller mounted in desktop enclosure with I/O cable for the PDP-11/23-PLUS.	RDX51-DD
0.8-Mbyte diskette drive for mounting in 19-inch standard equipment rack. Requires H9302 enclosure.	RX50-RB
0.8-Mbyte diskette drive with controller mounted in H9302 rackmount chassis with I/O cable for the PDP-11/23-PLUS.	RX50-RF
10-Mbyte RD51 drive and 0.8-Mbyte diskette drive with controller mounted in H9302 rackmount chassis with I/O cable for the PDP-11/23-PLUS.	RDX51-RD
Rackmount chassis for use with up to two 5 1/4-inch mass storage devices, RD51, RD52, or RX50, in any combination.	H9302

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
RX50-AA	Dedicated Space	1.0	1.8	N/A	N/A	N/A

**Product Information**

The RD51 is an 11-Mbyte nonremovable disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing, which conforms to the industry standards for 5¹/₄-inch disk media. The sealed head/disk assembly (HDA) contains two platters, four read/write heads, and positioning arm. The sealed HDA helps to increase drive reliability and ensure data integrity.

The RD51 is available in two distinct packaging styles. The RD51-A is intended to be 'added into' the MicroPDP-11 system enclosure. The RD51-D and RD51-R are mounted in their own separate desktop or rackmount enclosures, and 'added on' to a system, such as a PDP-11/23-PLUS or MicroPDP-11. When used with the RQDX1 controller (MicroPDP-11) the RD51 is formatted for 11-Mbytes. Refer to examples of additional disk configurations.

Performance Characteristics

- Average access time: 93.3 msec
- Average rotational latency: 8.33 msec
- Transfer rate: 5 Mb/s (625 Kbits/s)

Media Characteristics

- Formatted capacity: 11 MBytes
- Recording surfaces (heads): 4
- Bytes per sector: 512
- Sectors per track: 18
- Track per drive: 1,200
- Recording method: Modified Frequency Modulation (MFM)

RD51 Order Codes

Option	Order Code
11-Mbyte Winchester disk drive.	RD51-A
11-Mbyte Winchester drive mounted in desktop enclosure with I/O cable.	RD51-DB
Add-on 11-Mbyte Winchester drive with controller mounted in desktop enclosure with I/O cable for the MicroPDP-11.	RD51-DF
11-Mbyte Winchester drive with controller mounted in desktop enclosure with I/P cable for the PDP-11/23-PLUS.	RD51-DD
11-Mbyte RD51 drive and 0.8-Mbyte RX50 diskette drive with controller mounted in desktop enclosure with I/O cable for the PDP-11/23-PLUS.	RDX51-DD
11-Mbyte Winchester drive for mounting in 19-inch standard equipment rack. Requires H9302 enclosure.	RD51-RB
Add-on 11-Mbyte Winchester drive with drive bus extender module (RQDX1-E) mounted in H9302 rackmount chassis with I/O cable for the MicroPDP-11.	RD51-RF
11-Mbyte Winchester drive with controller mounted in H9302 rackmount chassis with I/O cable for the PDP-11/23-PLUS.	RD51-RD
11-Mbyte RD51 drive and 0.8-Mbyte RX50 diskette drive with controller mounted in H9302 rackmount chassis with I/O cable for the PDP-11/23-PLUS.	RDX51-RD
Rackmount chassis for use with as many as two 5 ¹ / ₄ -inch mass storage devices, RD51, RD52, or RX50, in any combination.	H9302

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
RD51A	Dedicated Space	1.0	1.8	N/A	N/A	N/A

Product Information

The RD52 is a 31-Mbyte nonremovable disk drive that uses state-of-the-art Winchester technology. The drive mechanism is packaged in a single compact housing, which conforms to the industry standards for 5¹/₄-inch disk media. The sealed head/disk assembly (HDA) helps to increase drive reliability and ensure data integrity.

The RD52 is available in two distinct packaging styles. The RD51-A is intended to be 'added into' the MicroPDP-11 system enclosure. The RD52-DB and RD52-RB are mounted in their own separate desktop or rackmount enclosures, and 'added on' to a system, such as a PDP-11/23-PLUS or MicroPDP-11. Refer to examples of additional disk configurations.

Performance Characteristics

- Average access time: 57.5 msec
- Average rotational latency: 8.5 msec
- Transfer rate: 5 Mb/s (625 Kbits/s)

Media Characteristics

- Formatted capacity: 31 MBytes
- Bytes per sector: 512
- Sectors per track: 18
- Track per drive: 3,485
- Recording method: Modified Frequency Modulation (MFM)

RD52 Order Codes

Option	Order Code
31-Mbyte Winchester disk drive.	RD52-A
31-Mbyte Winchester drive mounted in desktop enclosure with I/O cable.	RD52-DB
31-Mbyte Winchester drive for mounting in 19-inch standard equipment rack. Requires H9302 enclosure.	RD52-RB
Rackmount chassis for use with as many as two 5-inch mass storage devices, RD51, RD52, or RX50, in any combination.	H9302

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
RD52-A	Dedicated Space	1.5	2.5	N/A	N/A	N/A



Product Information

The TK25 is an easy-to-use cartridge tape drive packaged in a standalone table-top enclosure. It is designed for fast back-up of the high capacity, mini Winchester disks used on the MicroPDP-11, the PDP-11/23-PLUS, the PDP-11/23-S, and the MicroVAX II (with the BA123 system). The TK25 will serially record up to 60 MBytes on a DC600A, 1/4-inch tape cartridge. It can copy any of today's mini Winchester disks on a single cartridge. The TK25 subsystem also has a universal power supply with cooling, a quad slot Q-bus interface card with a 41 or 81-centimeter (16 or 32-inch) internal CPU cable and a 2.74-meter (9-foot) CPU-to-drive cable.

For add-on to PDP-11/23-PLUS, you may need KDF11-B2 for bootstrapping capability. See the *Communications Options* section of this catalogue for a detailed description of KDF11-B2.

Performance Characteristics

- Read/Write Speed: 55 in/s streaming
- Transfer Rate: 55 KBits/s
- Number of Data Tracks: 10
- Recording Method: Serial, serpentine pattern
- Recording Density: 8,000 b/in
- Record Size: 1 KB to 16 KBytes
- Capacity: 60 MBytes (8-KB block)
- Recording Medium: 1/2 in tape cartridge with 600 ft (183 m) long tape
- Interface: Q22 bus, TS11 software compatible

TK25

Option	Order Code
Standalone 60-Mbyte cartridge tape drive includes drive, Q-bus interface card, packaging, external cable, universal power supply, and cabinet kit. Cabinet kit includes a 0.41-m (16-in) CPU cable. For use with MicroPDP-11, PDP-11/23-S, or MicroVAX II with BA123 system.	TQK25-EA
Same as TQK25-EA except cabinet kit includes a 0.81-meter (32-inch) CPU cable. For use with PDP-11/23-PLUS.	TQK25-EC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @		Bus Loads Drawn		I/O Panel Insert Size
		+ 5V	+ 12V	AC	DC	
TQK25	1 Quad Slot	4.0	0.0	2.0	1.0	A



Product Information

The RC25 Fixed/Removable Disk subsystem has 52 Mbytes of formatted user data. The 25.4- × 25.4- × 50.8-centimeter (10- × 10- × 20-inch) standalone unit contains an intelligent controller and onboard microdiagnostics. The fixed disk is a 26-Mbyte Winchester which combined with the RC25's 26-Mbyte sealed removable cartridge provide one-to-one backup ratio and an attractive alternative to disk/tape configurations.

By utilizing Mass Storage Control Protocol support the RC25 is compatible with other Digital Storage Architecture disk subsystems. Exceptional data reliability and integrity features include a powerful 170-bit error detection and correction code, automatic retry and revectoring, embedded servos, and bad block replacement.

For add-on to PDP-11/23-PLUS, KDF11-B2 may be needed for bootstrap capability. See the *Options* section of this catalog for a detailed description of the KDF11-B2.

Performance Characteristics

- Peak transfer rate: 1.25-MB/s
- Seek time: 10 msec
- Track-to-track: 10 msec
- Average: 35 msec
- Maximum: 55 msec
- Average rotational latency: 10.5 msec
- Average access time: 45.5 msec
- Formatted capacity per drive: 52-MB

Expansion Specifications

- Drives per controller: Two

RC25 Order Codes

Option	Order Code
UNIBUS Subsystems	
Tabletop RC25 with UNIBUS adapter.	RUC25-AB
Rackmountable RC25 with UNIBUS adapter. Mounts in H9642-F and H9642-M UNIBUS expansion cabinets.	RUC25-BB
Rackmountable dual RC25s with UNIBUS adapter. Mounts in H9642-F and H9642-M UNIBUS expansion cabinets.	RUC25-CB
Q-bus Subsystems	
Tabletop RC25 with Q-bus controller.	RQC25-AB
Rackmountable RC25 with Q-bus controller.	RQC25-BB
Rackmountable dual RC25s with Q-bus controller.	RQC25-CB
Disk Drives	
Tabletop add-on RC25.	RC25-DB
Rackmountable add-on RC25. Mounts in H9642-F and H9642-M UNIBUS expansion cabinets.	RC25-EB
Tabletop add-on RC25 for VAX-11/725 only.	RC25-GB
Disk Cartridges	
Removable 26-Mbyte RC25 cartridge.	RC25K-DC

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn		I/O Panel Units
		+5V	+15V	-15V	AC	DC	
RUC25	1 Quad Slot	4.3	0.0	0.0	5.0	1.5	1

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
RUC25		120	60	1	5.5	200	720	5-15R	25.6	25.4	52.0	22.7
RUC25		240	50	1	3.5	200	[683]	6-15R	[10.1]	[10.0]	[20.0]	[50.0]

Product Information

The TA78 tape subsystem is a rugged and reliable high-performance tape companion for the RA81 (as well as other disk products). The pair provides well-matched fixed and removable media for large-system operation.

The TA78 is packaged with its formatter in a single cabinet that is radially connected to the HSC5X-CA interface in the HSC50 storage server. An HSC5X-CA interface can support four TA78s, and each TA78 master tape system can support three TU78 add-on tape drives. Automatic tape loading, along with the drive's high speed, enhances both performance and operation ease.

The TA78 runs self-test diagnostics at startup and whenever data is not being transferred. A terminal (VT100 or a hand-held version) can be connected directly to the tape unit so that should a problem arise, service personnel can diagnose and isolate fault conditions without interfering with other system operations.

Note that adding a TA78 requires specific revision levels. Please contact your Sales Representative for the revision levels.

Performance Characteristics

- Read/write speed: 125 in/s
- Maximum data transfer speed: 200 KB/s(PE), 781 KB/s(GCR)
- Rewind speed: 440 in/s
- Rewind time: 65 seconds per 2400 ft
- Number of tracks: 9
- Recording method: Group Code Recording to ANSI X3.54-1976 and Phase Encoded to ANSI X3.39-1973
- Record Density: 6250 b/in (GCR), and 1600 b/in (PE)
- Capacity: 140 MB (GCR), 40 MB (PE)
- Recording medium: 0.5-inch magnetic tape, conforms to ANSI standard X3.40-1981

Expansion Specifications

- TA78 tapes per HSC5X-CA interface: 4
- TU78 add-ons per TA78 tape: 3

Initial Configuration Supported

1. An HSC50 will support up to six tape drives in any combination of TA78 masters and TU78 slaves, whether attached to one or multiple HSC5X-CA.

2. A TA78 must be connected to a single HSC5X-CA. Dual porting is currently not supported.

Usage Guidelines

1. Block sizes for writing to tape using VMS must not exceed size specified in the VMS default options. There are no restrictions on block sizes for local HSC utilities.

2. The VMS DUMP utility is infrequently used but is a very large consumer of resources. You must limit the use of this utility. The DUMP utility should be run by one task at a time, never concurrently.

TA78 Order Codes

Option	Order Code
TA78 High-density magnetic tape subsystem.	
<i>Prerequisite:</i> HSC50 with HSC5X-CA.	TA78-BJ
TU78 add-on tape transport.	TU78-AJ



Product Information

The TU81 is Digital's high-density industry-compatible magnetic tape subsystem for VAX computers. It includes a UNIBUS compatible controller.

An entry-level group coded recording (GCR) drive, the TU81 offers the lowest cost of ownership and highest reliability of any Digital-supported GCR tape drive. Ease of use, speeds of 25 and 75 inches per second, competitive pricing, and compact space-saving packaging make the TU81 the ideal tape drive for Digital's midrange systems with high-capacity disks. In addition, the TU81 uses the software protocol of the Digital Storage Architecture (DSA), which significantly enhances its performance.

As a dual-density drive, the TU81 conforms to the ANSI standard for GCR with 6250 bits per inch and for Phase Encoding (PE) with 1600 bits per inch on 1/2-inch, nine-track tape. As such, the TU81 can read and write tapes for data interchange with other GCR and PE tape systems, whether Digital's or those of other manufacturers.

Efficient design allows the TU81 and the 456-Mbyte RA81, or the 121-Mbyte RA80 to be packaged in a single waist-high cabinet for a fully integrated disk and tape subsystem. This minimal use of floorspace and the drive's exceptionally quiet operation make the TU81 well-suited for today's open office environments.

When ordered as part of a system, a rackmountable RA80 or RA81 disk drive will be configured in the bottom of the TU81 cabinet if no space is available in a dedicated disk cabinet on that order. Similarly, when ordered as part of a field add-on order, a rackmountable RA80 or RA81 will be mounted in the bottom of the TU81 if there is no space in a dedicated disk cabinet on that order.

Any desired exception to these guidelines should be noted on the order.

Performance Characteristics

- Read/write speed: 75 and 25 in/s (streaming), 25 in/s (start/stop)
- Maximum data transfer speed 468 KB/s
- Rewind speed: 192 in/s
- Rewind time: 2.5 minutes per 2400 ft (731.5 m) reel
- Number of tracks: 9
- Recording method: Group Code Recording to ANSI X3.54-1976 and Phase Encoded to ANSI X3.39-1973
- Record Density: 6250 b/in (GCR), and 1600 b/in (PE)
- Capacity: 140 MB (GCR), 40 MB (PE)
- Recording medium: 1/2-inch magnetic tape, conforms to ANSI standard X3.40-1981

Expansion Specifications

- Transports per controller: 1
- One RA80, or RA81 disk can be mounted in cabinet
- Maximum of four TU81 subsystems per VAX-11/780 UNIBUS
- Maximum of two TU81 subsystems per VAX-11/750 system
- Maximum of one TU81 subsystem per VAX-11/730 system

TU81 Order Codes

Option	Order Code
TU81 High-density magnetic tape subsystem.	TU81-AB

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
TU81-AB	1 Quad Slot	4.0	0.0	0.0	1.0	1



Product Information TU80

The TU80 is Digital's lowest-cost industry-compatible magnetic tape subsystem. As the perfect complement to Digital's midrange systems and disks, the TU80 offers the lowest cost of ownership and the highest reliability of any digital-supported nine-track tape drive.

Speeds of 25 and 100 inches per second, competitive pricing, compact space-saving packaging, and ease of use provide the ideal match to needs usually found in midrange applications. The TU80 conforms to the ANSI standard for phase encoding (PE) with 1600 bits per inch on 1/2-inch nine-track tape. Efficient design allows the TU80 and the 121-Mbyte RA80 or 456-Mbyte RA81 to be packaged in a single waist-high cabinet for a fully integrated disk and tape subsystem. This minimal use of floor space and the drive's exceptionally quiet operation make the TU80 ideal for today's open office environments.

With its streaming tape technology, the TU80 is ideal for applications such as disk backup. Yet it also uses traditional start/stop technology for shorter data transfers of the type associated with journaling and classical data processing. The controller automatically selects the speed to optimize the drive's performance for a particular application. The TU80 is a complete subsystem that is easily interfaced to any PDP-11 UNIBUS system.

TU80 subsystems include a horizontally mounted TU80 drive in its own 105.7-centimeter (41.6-inch) high H9642-style cabinet, power controller, UNIBUS adapter module, and a 7.6-meter (24-foot) shielded inter-cabinet cable to connect the TU80 to a CPU cabinet.

When ordered as part of a system, a rackmountable RA80 or RA81 disk drive will be configured in the bottom of the TU80 cabinet if no space is available in a dedicated disk cabinet on that order. Similarly, when ordered as part of a field add-on order, a rackmountable RA80 or RA81 will be mounted in the bottom of the TU80 if there is no space in a dedicated disk cabinet on that order. Any desired exceptions to these guidelines should be noted on the order.

Performance Characteristics

- Read/write speed: 25 and 100 in/s (streaming), 25 in/s (start/stop)
- Maximum data transfer speed: 160 KB/s
- Rewind speed: 192 in/s
- Rewind time: 2.5 minutes per 2,400-ft reel
- Number of tracks: 9
- Recording method: Phase encoded to ANSI standard X3.54-1976
- Record density: 1600 b/in
- Capacity: 40 MB (8-KByte block size)
- Recording medium: 1/2-inch magnetic tape, conforms to ANSI standard X3.40-1981

Expansion Specifications

- Transports per controller: 1
- One RA80 or RA81 disk can be mounted in cabinet
- Maximum of four TU80 subsystems per VAX-11/780 UNIBUS
- Maximum of 2 TU80 subsystems per VAX-11/70 system
- Maximum of 1 TU80 subsystem per VAX-11/730 system

TU80 Order Codes

Option	Order Code
TU80 magnetic tape subsystem	TU80-AB

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+ 5V	+ 15V	-15V		
TU80	1 Quad Slot	4.0	0.0	0.0	1.0	1

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
TU80-AB		240	50	1	2.6	500	1800	6-15R	105.9	54.0	76.2	102.2
TU80-AB		240	50	1	2.6	500	[1706]	6-15R	[41.7]	[21.3]	[30.0]	[225.0]



Product Information

The TU77 is a high-performance, automatic-loading tape transport that uses industry-compatible recording densities of 1600 bits per inch Phase Encoded (PE) and 800 bits per inch Non-Return to Zero Inverted (NRZI) selectable under program control. The TU77 magnetic tape subsystems for Digital systems include the controller/MBA, a tape formatter, and one 9-track TU77 tape transport. The TU77 tape transport is mounted in a 152.4-centimeter (60-inch) high H9652 single-width highboy cabinet.

For operation above 610 meters (2,000 feet), a high altitude kit must be installed. Consult your Digital Field Service Engineer for details.

Performance Characteristics

- Record density: 1600 b/in, 800 b/in
- Read/write speed: 125 in/s
- Capacity per 2,400-ft reel:
 - 40 MB with 8-KB blocks at 1,600 b/in
 - 20 MB with 8-KB blocks at 800 b/in
- Maximum data transfer speed: 200 KBits/sec
- Rewind Speed: 440 in/s
- Rewind time: 70 sec per 2,400-ft reel

Expansion Specifications

- Transports per controller: 4
- Devices per MASSBUS Adapter: 4 TU77 transports and 7 MASSBUS disk drives

TU77 Order Codes

Option

Order Code

PDP-11 Subsystems

TU77 magnetic tape transport, formatter, and controller.

TJU77-AD

VAX-11/750 Subsystems

TU77 magnetic tape transport, formatter and VAX-11/750 MBA

TGU77-FD

VAX-11/780 Subsystems

TU77 magnetic tape transport, formatter and VAX-11/780 MBA

TEU77-FD

Add-on Tape Drives

TU77 magnetic tape transport.

Prerequisite: TJU77, TGU77 or TEU77

TU77-AJ

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
TEU77	1 OPS	0.0	0.0	0.0	0.0	1
TGU77	1 I/O Slot	0.0	0.0	0.0	0.0	1
TJU77	2 SUs	12.0	0.0	0.4	1	1

Product Information

The TU78 is a high-performance, automatic-loading tape transport that uses industry-compatible recording densities of 1600 bits per inch phase encoded (PE), and 6250 bits per inch group coded recording (GCR), selectable under program control. TU78 magnetic tape subsystems for VAX-11/750 and 780 systems include a MASSBUS adapter, a tape formatter, and one 9-track TU78 tape transport. The TU78 tape transport is mounted in a 152.4-centimeter (60-inch) high H9602 single-width highboy cabinet. Dual-port capability is optional on masters.

For operation above 610 meters (2,000 feet), a high altitude kit must be installed. Consult your Digital Field Service representative for details.

Performance Characteristics

- Record density: 6250/1600 b/in
- Read/write speed: 125 in/sec
- Storage capacity per 2,400 ft reel: 145 MB @ 6,250 b/in
- Maximum data transfer speed: 781 KB/sec
- Rewind speed: 440 in/sec
- Rewind time: 70 sec per 2,400 ft reel

Expansion Specifications

- Devices per MASSBUS adapter: 4 TU78 transports and combined total of 7 MASSBUS disk drives/TU78 masters. Each master can support 3 additional transports, providing a possible maximum total of 32 transports per MASSBUS adapter

TU78 Order Codes

Option	Order Code
VAX-11/750 Subsystems	
TU78 magnetic tape transport, formatter, and VAX-11/750 MBA	TGU78-FD
VAX-11/780 Subsystems	
TU78 magnetic tape transport, formatter, and VAX-11/780 MBA	TEU78-FD
Dual-ported TU78 magnetic tape transport, formatter, and two VAX-11/780 MBAs	TEU78-FJ
Master Tape Drive	
TU78 magnetic tape transport and formatter. Requires a TM78-C for dual-porting capability.	
<i>Prerequisite:</i> MBA and round MASSBUS cable connector from another MASSBUS peripheral	TU78-AD

Option	Order Code
Tape Drives	
TU78 magnetic tape transport (without formatter).	
<i>Prerequisite:</i> TGU78 or TEU78 or TU78 Master	TU78-AJ
Dual Port Kit	
TU78 dual-port kit containing drive logic and cables to provide dual-porting capability.	
<i>Prerequisite:</i> TEU78-FD or TU78-AD	TM78-C

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
TEU78	1 OPS	0.0	0.0	0.0	0.0	N/A
TEU78	2 OPS	0.0	0.0	0.0	0.0	N/A
TGU78	1 I/O Slot	0.0	0.0	0.0	0.0	1

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
TGU77-FB	¹	240	60	1	12.0	2300	7848	L6-20R	60.3	27.3	30.0	630.0
TGU77-FD	¹	240	50	1	12.0	2300	[8280]	L6-20R	[153.0]	[69.2]	[76.2]	[286.0]
TGU78-FB	¹	240	60	1	10.2	1960	6688	L6-30R	60.3	27.3	30.0	630.0
TGU78-FD	¹	240	50	1	10.2	1960	[7055]	L6-30R	[153.0]	[69.2]	[76.2]	[286.0]
TU77-AF		240	60	1	10.4	2000	6824	L6-20R	60.3	26.3	30.0	560.0
TU77-AJ		240	50	1	10.4	2000	[7199]	L6-20R	[153.0]	[66.7]	[76.2]	[254.2]
TU78-AB		240	60	1	10.2	1960	6688	L6-30R	60.3	26.3	30.0	630.0
TU78-AD		240	50	1	10.2	1960	[7055]	L6-30R	[153.0]	[66.7]	[76.2]	[286.0]
TU78-AF		240	60	1	7.8	1500	5118	L6-30R	60.3	26.3	30.0	560.0
TU78-AJ		240	50	1	7.8	1500	[5399]	L6-30R	[153.0]	[66.7]	[76.2]	[254.2]

NOTES = MASSBUS TAPES

¹ Power and cooling requirements of MASSBUS Adapter(s) are available in the Site Preparation Data for CPU Non-Cabinet Level Options.



Product Information

The TS05 magnetic tape subsystem includes a tape transport with an integral formatter and an interface/controller module with interconnecting cables. The TS05 is available with either a Q-bus or a UNIBUS controller.

The tape transport occupies only 22 centimeters (8.7 inches) in a H9642-type 106-centimeter (41.7-inch) high cabinet, thus allowing ample room for expansion. It is a high performance 1/2-inch subsystem incorporating streaming technology, and is Digital's only industry-standard tape subsystem available for Q-bus systems.

It offers industry-standard 1600 bit per inch Phase Encoded format, ANSI compatibility, a storage capacity as much as 40 MBytes using 8-KByte blocks, high-speed streaming backup, and front-loading automatic tape threading operation. The TS05 is available for rackmounting only.

Prerequisite for TS05 Q-bus magnetic tape subsystem: any PDP-11/23-based system (PDP-11/23, PDP-11/23-PLUS, or MicroPDP-11).

Prerequisite for TS05 UNIBUS magnetic tape subsystem: any PDP-11/24, or PDP-11/44.

To connect a TSV05 to a MicroPDP-11, you need two of each of the following parts:

- 17-00277-0 15-inch mirror image cable.
- 12-14614-02 50-pin bulkhead connectors.

For add-on to PDP-11/23-PLUS, you may need KDF11-B2 for bootstrap capability. See the *Options* section of this catalog for a detailed description of KDF11-B2.

Performance Characteristics

- Read/write speed: 25/100 in/s (depending upon operating system)
- Capacity per 2,400-ft reel:
 - 40 MB with 8-KB blocks at 1600 b/in
- Maximum data transfer speed: 40 or 160 KBits/s
- Rewind Speed: 180 in/s (max)
- Rewind Time: 2.8 minutes per 2,400-ft reel

Expansion Specifications

- Transports per controller: 1

TS05 Order Codes

Option	Order Code
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Q-bus Subsystems

TS05 magnetic tape system with hardware for rackmounting, Q-bus controller, and cables.	TSV05-AB
Same as TSV05-AB except 220 Vac system.	TSV05-AD
TS05 magnetic tape system mounted in a 106-centimeter (41.7-inch) H9642 cabinet with power controller and 53.3 centimeters (21 inches) of expansion space. Q-bus controller. No side panels.	TSV05-BB
Same as TSV05-BB except 220 Vac system.	TSV05-BD

UNIBUS Subsystems

TS05 magnetic tape system with hardware for rackmounting, UNIBUS controller, and cables.	TSU05-AB
Same as TSU05-AB except 220 Vac system.	TSU05-AD
TS05 magnetic tape system mounted in a 106-centimeter (41.7-inch) H9642 cabinet with power controller and 53.3 centimeters (21 inches) of expansion space. No side panels.	TSU05-BB
Same as TSU05-AD except 220 Vac system.	TSU05-AD

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
TS05	1 Quad Slot	6.5	0.0	3.0	1.0	1



Product Information

The TU58 UNIBUS dual-drive cartridge tape subsystems are random access, mass storage devices that read and write data on block-addressable, preformatted tape cartridges.

Data integrity feature includes automatic read retries initiated by the controller to ensure accurate data recording and retrieval. This feature eliminates the host computer overhead normally associated with rereading soft errors. Each transport has a high-quality read/write head.

The TU58 can be used for software updates, for loading diagnostics, or as a convenient medium for private file storage.

These subsystems consist of a controller, two drives, universal power cords, boot chip, 5.5-meters (18-feet) of I/O cable to interface with a serial line unit (DL11-E or DLVJ1, which is a prerequisite), and two TU58-K media.

Performance Characteristics

- Recording density: 800 b/in
- Read/write speed: 30 in/s
- Capacity per cartridge: 256 KB
– (formatted in 512 blocks of 512 bytes each)
- Maximum data transfer speed 3.7 KB/s (38.4 Kbaud)
- Rewind speed: 60 in/s
- Rewind time: 30 seconds per 140-ft cartridge

TU58 Order Codes

Option	Order Code
Cabinet-mountable, dual-drive cartridge tape subsystem including the necessary hardware for mounting in standard cabinetry.	TU58-DA
Tabletop, dual-drive cartridge tape subsystem.	TU58-EB
One 256-Kbyte TU58 data cartridge.	TU58-K

Product Information

The TE16 tape transport uses industry-compatible recording densities of 1600 bits/inch Phase Encoded (PE) and 800 bits/inch Non-Return to Zero Inverted (NRZI) selectable under program control.

The TE16 magnetic tape subsystems for VAX-11/750 and VAX-11/780 systems include a MASSBUS adapter, a tape formatter, and one nine-track TE16 tape transport. The TE16 is mounted in a 152.4-centimeter (60-inch) single-width highboy cabinet.

Performance Characteristics

- Record density: 1600, 800b/in
- Read/write speed: 45 in/s
- Storage capacity per reel (8 KB blocks):
 - 40 MB with 8 KB blocks @ 1600 b/in
 - 20 MB with 8 KB blocks @ 800 b/in
- Maximum data transfer speed:
 - 72 KB/s @ 1600 b/in
 - 36 KB/s @ 800 b/in
- Rewind speed: 150 in/s
- Rewind time: 3.7 minutes per 2,400-foot reel

Expansion Specifications

- Transports per controller: 8
- Devices per MASSBUS adapter: eight TE16 transports and seven MASSBUS disk drives

TE16 Order Codes

Option	Order Code
PDP-11 Subsystems	
TE16 magnetic tape transport, formatter, and controller.	TJE16-AD
VAX-11/750 Subsystems	
TE16 magnetic tape transport, formatter, and VAX-11/750 MBA	TGE16-FD
VAX-11/780 Subsystems	
TE16 magnetic tape transport, formatter, and VAX-11/780 MBA	TEE16-FD
Add-on Tape Drives	
TE16 magnetic tape transport.	
<i>Prerequisite:</i> TJE16, TGE16 OR TEE16	TE16-AJ

1914-1915

The following is a list of the members of the American Medical Association who have died during the year 1914-1915.

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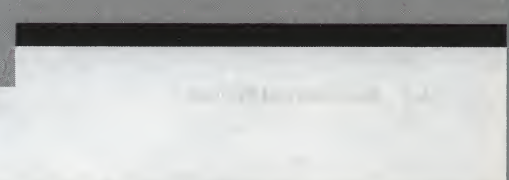
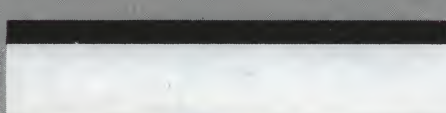
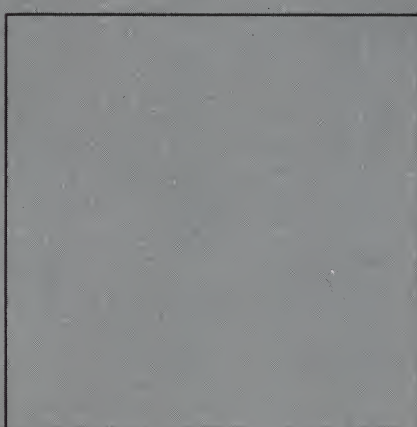
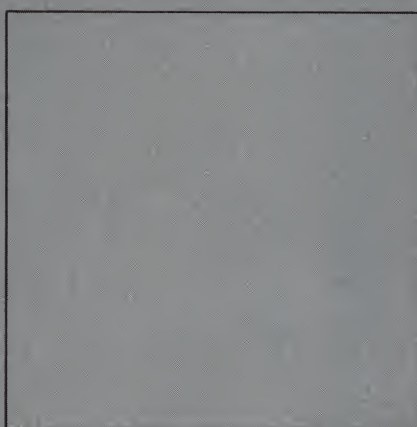
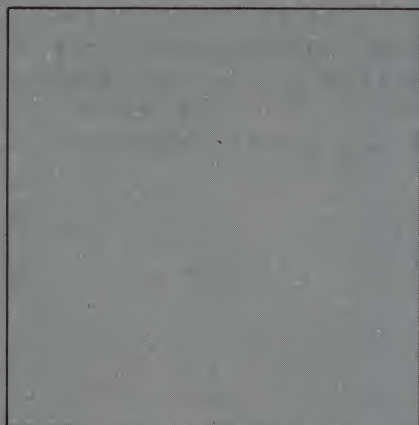
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The first step in the process of creating a document is to create a new document. This can be done by clicking on the "File" menu and then selecting "New". This will create a new document with a default name of "Document 1".

The next step is to enter text into the document. This can be done by clicking on the "Text" tool in the toolbar and then clicking on the document area. This will create a text box where you can enter text.



Digital's terminals and printers provide an interface to your computer system that can eliminate bottlenecks. Additional video terminals or a higher-speed system printer can facilitate recordkeeping by placing a printing terminal close to a group of users. Their high-quality display and reliability make Digital terminals and printers comfortable and easy to use.

The standard features of the ASCII asynchronous VT200 family of video terminals includes all of the universal features of the VT100 family. These include non-volatile set-up memory, a detachable keyboard, 80- or 132-character line widths, selectable smooth or jump scrolling, and split-screen capability. In addition, the VT200 and VT100 families of video terminals have monochrome and color graphic capabilities.

The RT100 family of ruggedized terminals described in the *Industrial Systems* section of this catalog perform the same applications as the VT100 family of video terminals, but are designed to tolerate severe industrial environments.

Digital also provides a complete line of printers including receive-only (RO) and keyboard send/receive (KSR) models. Each has its own unique combination of features and performance. You can choose from letter-quality, multiple character fonts, or automatic single-sheet feed. Most of Digital's printers share features including a variety of character sizes, multiple baud rates for flexibility in communications, and 132 print columns.



VT200 Family

Digital's newest family of video terminals, the VT220, the VT240, and the VT241, advance the standard set by Digital's VT100 family of video terminals. The VT200 family includes all the universal features of the VT100 family and expands these further by letting you control more of the terminal's operations. A series of user-friendly set-up menus make tailoring the terminal to your application easy.

The VT220, the VT240, and the VT241 terminals have a sleek design that incorporates ergonomic features while maintaining VT100 functionality. These ergonomic features include a non-glare screen (available with white, green, or amber phosphors), low profile detachable keyboard, and an adjustable monitor that is applicable only to the VT200 and VT240.

VT200 family features include VT52 emulation, advanced video features, a built-in printer port, and U.S./European modem controls. International capabilities include a multinational character set, universal power supply, and both 20 mA and EIA interfaces. A plain-language (French, German and English) set-up menu and 25 function keys (15 programmable) make the VT200 family easy to use. Operator-oriented features such as split screen, bidirectional smooth scrolling, double height/double width characters, and reverse video allow the VT200 family to highlight text and create formats to suit many applications.

The VT220 and VT240 series terminals can be used with any Digital processor. The VT200 family is also fully compatible with Digital printers.

Features

- Universal VT100 features
- VT100 and VT52 compatibility modes
- Set-up menus in English, French, and German
- 15 programmable function keys
- Down-line loadable character set
- Line drawing character set
- Advanced video features (bold, blink, reverse and underline character highlighting)
- Double height/double width characters
- 24 lines × 80 or 132 characters
- Erase selected text
- Selectable local echo
- Communication speeds up to 19,200 baud
- 7-bit and 8-bit character support
- Multinational character set and National Replacement Character Sets
- CRT saver
- Serial printer port for hardcopy output
- EIA and 20 mA interfaces (standard)
- Universal power supply
- Small, compact design with detachable keyboard
- Nonglare screen (available with white, green, or amber phosphors)
- Inverted T design of cursor keys
- Brightness and contrast controls
- Customer-installable
- Built-in self-test diagnostics

**VT220**

The VT220 video display terminal is the low-end member of Digital's VT200 video terminal family. It includes all of the universal VT200 family features. The VT220 is a monochromatic text terminal that has four operating modes—VT200 7-bit control mode, VT200 8-bit control mode, VT100 mode, and VT52 mode. Except for the VT52 mode, all modes support standard ANSI functions. The VT220 can connect to a host computer either remotely via an optional modem or locally.

Cables are not provided and must be ordered separately. To utilize the printer port the BCC05 cable is recommended. The recommended cables for terminal to host connections are as follows; BCC04 EIA cable for connection to a modem, and BC22D null modem cable for connection to a line unit.

Prerequisite: EIA/CCITT serial-line interface or equivalent.

Features

- Monitor tilt button
- Word processing keyboard available

Video Terminal Order Codes

Option	Order Code
White phosphor nonglare screen	VT220-A3
Green phosphor nonglare screen	VT220-B3
Amber phosphor nonglare screen	VT220-C3

VT220 Country Kit Order Codes

VT220 country kit	VT22K-A*
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*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

VT220 Word Processing Country Kit Order Codes

VT220 word processor country kit	VT22K-B*
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*Replace the asterisk in the word processing country kit order code with the letter that precedes the desired country/language listed below.

E-United Kingdom	G-Germany	H-Netherlands
I-Italy	P-France	S-Spain



VT240 & VT241

The VT240 and VT241 video display terminals are the mid- and high-range members, respectively, of Digital's VT200 terminal family. Like the VT220, they are interactive terminals that provide quality text with the additional capability of powerful medium-resolution bit-map graphics for a variety of applications.

The VT240 package consists of a monochrome monitor, a keyboard, and a system box which contains the power supply and logic. The VT241 package consists of a color monitor, a keyboard, and a system box.

The VT240 and VT241 have five operating modes: VT200 7-bit control mode, VT200 8-bit control mode, VT100 mode, VT52 mode, and 4010/4014 mode. Digital's ReGIS graphics capability is provided in both the VT100 and VT200 mode. Each mode supports both local and remote connections to the host. An optional integral modem provides auto answer/auto dial functionality. The printer port can be used as a serial input channel which supports data entry from an attached auxiliary device such as a digitizer.

Cables are not provided and must be ordered separately. To utilize the printer port the BCC05 cable is recommended. The recommended cables for terminal to host connections are as follows; BCC04 EIA cable for connection to a modem, and BC22D null modem cable for connection to a line unit. For a complete discussion of interface cables available from Digital for terminal interconnect, refer to the Terminals and Printers Handbook.

Prerequisite: EIA/CCITT serial-line interface or equivalent.

Additional Features

- ReGIS (Remote Graphics Instruction Set) and Tektronix™ 4010/4014 graphic modes
- A non-interlaced display
- Two graphics planes
- Monitor tilt button (VT240 only)
- Integral modem option available
- Word processing keyboard available

VT240 and VT241 Video Terminal Order Codes

Option	Order Code
Monochrome text and graphics terminals	
White phosphor nonglare screen	VT240-A3
Green phosphor nonglare screen	VT240-B3
Amber phosphor nonglare screen	VT240-C3
Color text and graphics terminals	
VT241 Color text and graphics terminal	VT241-A*

*Replace the asterisk in the VT241 terminal order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

VT240-Series Country Kit Order Codes

VT240-Series country kits	VT24K-A*
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*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

VT240-Series Word Processing Kit Order Codes

VT240-Series word processing country kit.	VT24K-B*
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*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

E-United Kingdom	G-Germany	H-Netherlands
I-Italy	P-France	S-Spain

Connection to VT200 Terminals

The cables needed to connect a printer to the terminal and connect the terminal to the computer is not included with the terminal. The table below summarizes the cabling needed for the terminal.

Interface	Connector On VT200	For Connection To	Digital Cable Recommended	
Printer Port	9 Pin EIA Male	Digital Printer	BCC05-10	10 ft.
			BCC05-10	25 ft.
			BCC05-50	50 ft.
			BCC05-A0	100 ft.
DATA	25 Pin EIA Male	Direct to Digital Computer	BC22D-10	10 ft.
			BC22D-25	25 ft.
			BC22D-35	35 ft.
			BC22D-50	50 ft.
		EIA Modem	BCC04-10	10 ft.
			BCC04-25	25 ft.
			BCC04-50	50 ft.

Note: For a complete discussion of interface cables available from Digital for terminal interconnect, refer to the Terminals and Printers Handbook.

The VT240 package consists of a monochrome monitor, a keyboard, and a system box which contains the power supply and logic. The VT241 package consists of a color monitor, a keyboard, and a system box.

The VT240 and VT241 have five operating modes: VT200 7-bit control mode, VT200 8-bit control mode, VT100 mode, VT52 mode, and 4010/4014 mode. Digital's ReGIS graphics capability is provided in both the VT100 and VT200 mode. Each mode supports both local and remote connections to the host. An optional integral modem provides auto answer/auto dial functionality. The printer port can be used as a serial input channel which supports data entry from an attached auxiliary device such as a digitizer.

Cables are not provided and must be ordered separately. To utilize the printer port the BCC05 cable is recommended. The recommended cables for terminal to host connections are as follows: BCC04 EIA cable for connection to a modem, and BC22D null modem cable for connection to a line unit.

Prerequisite: EIA/CCITT serial-line interface or equivalent.

Additional Features

- ReGIS (Remote Graphics Instruction Set) and Tektronix™ 4010/4014 graphic modes
- A non-interlaced display
- Two graphics planes
- Monitor tilt button (VT240 only)
- Integral modem option available
- Word processing keyboard available

Monochrome Text and Graphics Terminal Order Codes

Option	Order Code
White phosphor nonglare screen	VT240-A3
Green phosphor nonglare screen	VT240-B3
Amber phosphor nonglare screen	VT240-C3

**Color Text and Graphic Terminal
Order Codes**

VT241 Color text and graphics terminal.

VT241-A*

*Replace the asterisk in the color terminal order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain		

Country Kit Order Codes

Country kit for VT241.

VT24K-A*

*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	

Word Processing Kit Order Codes

BT241 Word Processing Country Kit

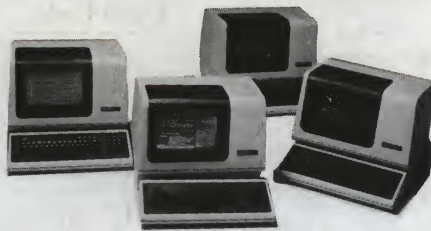
VT24K-B*

*Replace the asterisk in the word processing kit order code with the letter that precedes the desired country/language listed below.

A-English-speaking Canada	E-United Kingdom	G-Germany
H-Netherlands	I-Italy	P-France
L-German-speaking Switzerland	M-Sweden	N-Norway
P-France	S-Spain	

Connection to VT200 Terminals

The cables needed to connect a printer to the terminal and connect the terminal to the computer is not included with the terminal. The table below summarizes the cabling needed for the terminal.



VT100 Family

The VT100 family of desktop video terminals set the standard for conversational ASCII terminals. All four models, including the VT100, VT101, VT102, and VT131, are equipped with a sculptured, detachable keyboard connected to the video display by a 1.9-meter (6-foot) coiled cord. The keyboard allows users to set the terminals functions by setting tab stops, reversing the video image, or changing the cursor from underline to block.

More specifically, a VT101 video terminal adds local echo to the universal VT100 performance characteristics. Built into the VT102 and VT131 are a printer port and advanced video options. Adding the advanced video features to a VT102 and VT131 gives these terminals the ability to display characters in any combination of blinking, bold, underscore, or reverse video. In addition, the VT131 performs local editing and block-mode transmission capabilities.

Cables are not provided and must be ordered separately. The recommended cables include BC22B-xx for connection to a modem, and BC22D-xx, BC22E-xx, and BC22F-xx for local connection to a host.

Prerequisite: EIA/CCITT serial-line interface or equivalent.

Universal VT100 Family Features

- Baud rate: 50 to 19,200 b/s
- Format: 24 lines \times 80 characters
- Characters: 7 \times 9 dot matrix with descenders
- Character set: 94 displayable-character ASCII set and 32-character special line-drawing graphics set
- Double width/double height characters
- Standard numeric and function keypads
- Bidirectional vertical scrolling
- Selectable smooth or jump scrolling
- Split-screen capability
- Normal or reverse screen image
- Adjustable tabs
- Full-duplex operation
- Keyboard selectable features
- Nonvolatile setup memory
- Cursor control keys
- ANSI/VT52 command modes
- 20 character answerback message
- Selectable XON/XOFF buffer control
- Self-test diagnostics

VT100 Additional Features

- Format: 14 lines \times 132 characters, selectable

VT100 Order Codes

Option	Order Code
Video display terminal with universal power supply and 240 Vac power cord and plug.	VT100-AB
Same as VT100-AB with advanced video and word processing keyboard.	VT100-WB
VT100-WB with French keyboard.	VT100-WF
VT100-WB with Dutch keyboard.	VT100-WH
VT100-WB with German keyboard.	VT100-WK

VT101 Features

- Format: 14 lines × 132 characters, selectable
- Full-duplex, local-echo operation

VT101 Order Codes

Option	Order Code
Video terminal with a local echo, advanced video printer port, and 240 Vac power cord and plug.	VT101-AB
VT101 with 240 Vac power cord and U.K. plug.	VT101-A2
VT101 with 220 Vac power cord and Continental European plug.	VT101-A3
VT101 with 220 Vac power cord and Swiss plug.	VT101-A4

VT102 Features

- Advanced video features: 24 lines × 132 characters and normal or reverse video, blinking, underline and bold characters selectable on a character-by-character basis
- Enhanced terminal editing features—insert line, delete line, insert character, and delete character
- Print functions with or without host intervention
- Printer port for hardcopy output
- Full-duplex, local-echo operation
- Modem controls

VT102 Order Codes

Option	Order Code
Video terminal with local echo, advanced video printer port and 240 Vac power cord and plug.	VT102-AB
VT102-AB with 240 Vac power cord and U.K. plug.	VT102-A2
VT102-AB with 220 Vac power cord and Continental European plug.	VT102-A3
VT102-AB with 220 Vac power cord and Swiss plug.	VT102-A4
VT102-AB with word processing/DECword keyboard, EIA interface, 240 Vac power cord and plug.	VT102-WB
VT102-WB with word processing/DECWORD keyboard, 240 Vac, U.K. plug.	VT102-W2
VT102-WB with word processing/DECWORD keyboard, 240 Vac, and Continental European plug	VT102-W3
VT102-WB with word processing/DECWORD keyboard, 220 Vac, and Swiss plug.	VT102-W4

VT131 Features

- Advanced video features: 24 lines × 132 characters and normal or reverse video, blinking, underline and bold characters selectable on a character-by-character basis
- Enhanced terminal editing features – insert line, delete line, insert character, and delete character
- Print functions with or without host intervention
- Printer port for hardcopy output
- Half-duplex operation
- Full-duplex local echo operation
- Modem controls

VT131 Order Codes

Option	Order Code
Video display terminal with conversational block mode transmission capability.	VT131-AB
VT131-AA with 240 Vac power cord and U.K. plug.	VT131-A2
VT131-AB with 220 Vac power cord and Continental European plug.	VT131-A3
VT131-AB with 220 Vac power cord and Swiss plug.	VT131-A4

General Information

In addition to functional upgrade options, Digital carries a full range of accessories and supplies that are specifically designed for use with the VT200 and VT100 families of video terminals. These options have been tested to Digital standards so you can be assured of their compatibility and reliability. Here is a selection of options and accessories:

Ordering Information

Option and Accessory Order Codes	Option	Order Code
	2-meter (6-foot) cable for connecting the monochrome monitor to the system box. VT240 series only.	BCC02-06
	2-meter (6-foot) cable for connecting the color monitor to the system box. For upgrading a VT240 to a VT241.	BCC03-06
	3.1-meter (10-foot) EIA cable for connecting a VT200 terminal to a modem.	BCC04-10
	3.1-tenth-meter (10-foot) EIA cable for connecting a VT200 terminal to a printer.	BCC05-10
	5.2-meter (15-foot) 20 mA cable for connecting a VT200 terminal to the host.	BC05F-15
	8.3-meter (25-foot) EIA null modem cable for connecting a VT200 terminal to the host.	BC22D-25
	Plastic membrane keyboard for use with VT100 series terminals. Its durable construction and flat membrane design enable it to withstand physical abuse and a wide range of liquid, solid, and airborne contaminants. Includes a 2-meter (6-foot) coiled cord.	RT1XX-AE
	20-mA interface adapter to convert VT100 terminal from an RS232-C interface to a 20 mA current loop interface for communications lengths exceeding 15.2 meters (50 feet). Includes BC05F-15 cable.	VT1XX-AA
	Advanced video option for the VT100/VT125. Provides four additional character attributes (bold, blink, underline, and reverse video in any combination), space and connections for an alternate character set ROM thus allowing an additional character set to reside in the terminal, converts screen memory from 14 lines of 132 columns to 24 lines of 132 columns.	VT1XX-AB
	Printer port option for connection of a VT100 to a hardcopy printer. Enables hardcopy printing off the video terminal, thus sharing one communication line between two peripherals. The printer port also allows local print functions without host intervention.	
	<i>Prerequisite:</i> VT1XX-AB	VT1XX-AC
	Blank full keyboard overlays for user-defined keys.	VT1XX-BA
	20-mA interface adapter to convert VT101/VT102/VT125/VT131 from an RS232-C interface to a 20 mA current loop interface for communications lengths exceeding 15.2 meters (50 feet). Includes BC05F-15 cable.	VT1XX-CA
	Graphics upgrade kit to convert VT100 to VT125 graphics terminal.	VT1XX-CB
	Word processing upgrade kit to convert VT100 and VT125 to word processing models.	VT1XX-CE

Option	Order Code
Nonglare panel. Reduces glare, enhances character contrast, and improves screen readability. Can be used with VT100 family. Easy to install and available in three colors:	VT1XX-F*
*Replace the asterisk in the nonglare panel order code with the letter which represents the color of nonglare panel desired.	
A-Gray B-Green C-Bronze	
Keypad overlays that identify special function keys with preprinted plastic overlays:	VT1XX-K*
*Replace the asterisk in the keypad overlay order code with the letter which precedes the overlay desired.	
A-KED/EDT for numeric keypads.	
B-FMS/FED for numeric keypads.	
C-FMS/FDV for numeric keypads.	
D-Clear bland overlays for numeric keypads with labels.	
Screen cleaning kit.	VT1XX-KF
Tilt/swivel base assembly providing an upward tilt of 15° and a downward tilt of 7.5°, plus 180° swivel capability for the VT100 family.	VT1XX-SA
Five-leg terminal stand with casters (requires customer assembly) for the VT100 family.	VT1XX-ST
Upgrade kit to convert a standard VT102 video terminal to an APL terminal. Minimum quantity of three.	VT1S2-PA

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VT100 Terminals Site Preparation Table

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
VT100-AB		240	50-60	1	.80	150	512 [540]	6-14R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT100-WB		240	50-60	1	.80	150	512 [540]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT101-AB		240	50-60	1	.37	70	240 [253]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT102-AB		240	50-60	1	.37	70	240 [253]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT102-PA		240	50-60	1	.37	70	240 [253]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	22.2 [56.5]	34.5 [15.6]
VT102-WB		240	50-60	1	.37	70	240 [253]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT125-AB		240	50-60	1	.80	150	512 [540]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT125-WB		240	50-60	1	.80	150	512 [540]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.6]	41.0 [18.6]
VT131-AB		240	50-60	1	.37	70	240 [253]	6-15R 6-15R	14.5 [36.8]	18.0 [45.7]	20.3 [51.4]	41.0 [18.6]



LN03

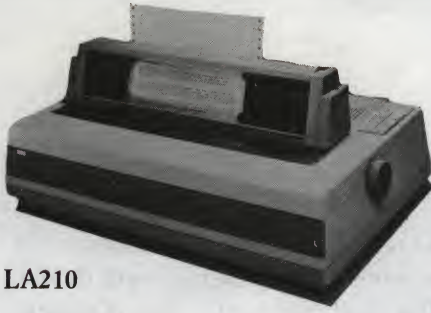
The LN03 is a tabletop, nonimpact, electronic laser printer and controller employing electrophotographic imaging and xerographic printing. Designed with the demands of the office in mind, the LN03 provides cost-effective, high-quality printing services for small groups of users with high volume printing needs. Applications that require fast turn-around and letter quality, such as reports, internal documents, newsletters, forms, labels and statements, are a perfect match for the LN03 capabilities. The LN03 can illustrate reports by integrating simple business graphics and text on a single page. It can print on transparencies to produce a set of overheads for business presentations. This product is designed to print about 3,500 pages per month. The LN03 includes a standard serial interface for compatibility with existing Digital printers.

Features

- Printing speed: 8 pages/min maximum
- Resident fonts: 16, using two typefaces
- Print modes: Landscape and portrait
- Print resolution: 300 × 300 dots per square inch
- Paper handling: Cutsheet plain paper, one 250-sheet cassette, 1.1-1.6 kg (16-24 lb) paper
- Paper Sizes: Standard: 21 × 29.7 cm (8.3 × 11.7 in)
- Noise level: Less than 55 dBa
- Graphics: Sixel protocol supported, resolution dependent on image size and complexity (150 dpi average)

LN03 Order Codes

Option		Order Code
Laser printer with kit which two toner cartridges, one OPC cartridge, one toner collection bottle, one package (250 sheets) A4 size paper, and national specific documentation.		LN03-A*
*Replace the asterisk in the LN03 order code with the letter that precedes the desired country/language listed below.		
B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain	T-Israel	V-Portugal
W-Italian-speaking Switzerland		



LA210

Digital's LA210 Letterprinter is a multimode, dot-matrix desktop printer compatible with both Digital and IBM-compatible personal computers. The LA210 may be used for a variety of personal computer applications. It produces spreadsheets, business graphics, and special formats. The LA210's multiple-print mode allows users to produce high-speed drafts, near letter-quality correspondence, and high-resolution, bit-map graphics.

The LA210 comes equipped to print 10 national languages in Courier 10, plus VT100 line drawing characters. In addition to the integral Courier typeface, a wide selection of optional typefaces, such as Gothic, Orator, and Italic, and a variety of character sets, including symbols and technical characters, can be added via convenient plug-in fonts.

Several other versions of the LA210 are available to accommodate a variety of national languages. Consult your Digital Sales Representative for ordering information.

Features

- Baud rate: 50 to 9600 b/s
- Print speed: 240 characters/s draft printing, 40 characters/s letter printing, 80 characters/s memo printing (optional)
- Character set: 7-bit 94 displayable ASCII character set and 8-bit multinational for 10 countries and VT100 line-drawing set
- Characters per inch: 5, 6, 6.6, 8.25, 10, 12, 13.2, 16.5 characters/in (draft mode); 5, 6, 10, 12 characters/in (near letter-quality mode)
- Bit-map graphics: 74-330 dots/in horizontal, 72 dots/in vertical.
- Lines per inch: 2, 3, 4, 6, 8, 12
- Universal power supply
- Parity: Even, odd, or none; 7- or 8-bits per character, selectable

LA210 Order Codes

Option	Order Code
RO printer for use with one to six part forms.	LA210-**



LA100

The Letterprinter 100/Letterwriter 100 is a tabletop, microprocessor-controlled, hardcopy printer and terminal. The Letterprinter 100 is the receive-only (RO) printer version, while the Letterwriter 100 is a keyboard send/receive (KSR) terminal. Highly versatile and multimode, the LA100s are ideal for use with video workstations, small systems and personal computers. The LA100 offers three types of print—letter-quality, memo-quality (optional), and draft-quality, plus bit-map graphics. The LA100s print on fanfold paper, roll paper, and office stationery. The user can select from a variety of resident typefaces or a greater selection of plugin cartridges. Digital also offers a custom font service for creation of special character sets or company logo. The LA100-PC model, designed for use with Digital's personal computers, offers graphics compatibility with Professional 300 series computers.

The LA100s are customer installable. They operate on full-duplex asynchronous communications lines and each includes a universal power supply, standard RS232-C interface, and RS232-C null modem cable (BC22D-xx).

Features

- Baud rate: 50 to 9600 b/s
- Print speed: 240 character/s (max) in draft printing, 40 characters/s (max) in letter printing are standard, and 80 characters/s in memo printing may be ordered as an option.
- Slew speed: 12.7 cm/s (5 in/s)
- Print columns: 40 to 217
- Character set: 7-bit 94 displayable ASCII character set for 11 countries, ANSI-compatible escape sequences, 8-bit national character set, and VT100 line drawing set (for the LA100-PC)
- Characters per inch: 5, 6, 6.6, 8.25, 10, 12, 13.2, 16.5
- Graphics: 132 × 72 dots/in resolution for all models except for the LA100-PC which has variable aspect ratios: 73-333 dots/in horizontal, 72 dots/in vertical.
- Universal power supply
- Parity: Even, odd, or none; 7 or 8 bits per character, selectable

LA100 Order Codes**Option****Order Code**

KSR hardcopy terminal with keyboard, numeric keypad, tractors, BC22A-25 cable, ribbon cartridge, one package of paper, and Courier-10/Orator-10 fonts in the US/UK character sets only.

LA100-AB

KSR hardcopy terminal with keyboard, numeric keypad, tractors, BC22A-25 cable, ribbon cartridge, one package of paper, Courier-10 font, international overlay, and VT100 line drawing set.

LA100-BB

KSR hardcopy terminal with keyboard, tractors, BC22A-25 cable, ribbon cartridge, one package of paper, Courier-10 font, international overlay, VT100 line drawing set, and multiple font option.

LA100-CB

RO printer for use with Digital's personal computers, includes 7- and 8-bit Digital standard 169 multinational character set, one starter package of fanfold paper, U.S. Courier-10 font, multinational Courier-10 font, VT100 line drawing character set, variable graphics aspect ratios, tractors, and multiple font option.

LA100-PC

RO printer tractors, BC22A-25 cable, ribbon cartridge, one package of paper, Courier-10 font, international overlay, and VT100 line drawing set.

LA100-ZB

**LA50**

The LA50 Personal Printer is a compact tabletop, dot-matrix printer designed for use with Digital's personal computers and video terminals. It features a draft mode, a memo mode, and graphics capability. The LA50 printer can use regular office stationery, fanfold paper, or multipart forms on a 25.4-centimeter (10-inch) wide platen. For multilingual purposes, a multinational character set is resident in this printer. The LA50 is customer-installable.

Features

- Baud rate: 110 to 4800 b/s
- Print speed: 100 char/s (text mode), 50 char/s (memo mode)
- Print columns: 40 to 132
- Character set: 94 displayable ASCII character set, multinational character set (11 languages), JIS Katakana set, VT100 line drawing set (27 special graphics characters), plus ANSI-compatible escape sequences
- Characters per inch: 10, 12, 16.5 single width-5, 6, 8.25 double width
- Characters: 7 × 9 dot matrix impact printing in text mode; 13 × 9 in memo mode
- Lines per inch: 2, 3, 4, 6, 8, 12
- Parity: Switch-selectable to odd, even, mark, or space; 7 or 8 bits per character (selectable)
- Print density: 144 or 180 dots/in horizontal (switch-selectable) and 72 dots/in vertical (in graphics mode)

LA50 Order Codes

Option	Order Code
Tabletop printer with push tractor feed and 220 Vac power supply.	LA50-RB
Tabletop printer with push tractor feed and 240 Vac power supply.	LA50-RC



LA12 DECwriter

The LA12 DECwriter Correspondent is an interactive terminal that prints on single sheets, two-part forms, fanfold paper and roll paper. Applications for the Correspondent include online timesharing, networking, database access, and program development. An acoustic coupler, dial-through-the-keyboard direct-connect modem, or direct-connect RS232-C are available for local hookup or accessing a remote host.

The Correspondent is customer installable. The modem in the LA12 is compatible with U.S. and Canadian communications requirements. Its acoustic coupler is compatible with European communications requirements. Character sets include the VT100 line drawing set and APL character sets. Communications cables are not included.

Features

- Baud rate: 50 to 9600 b/s
- Print speed: 150 characters/s (draft), 80 characters/s (memo)
- Slew speed: 5 in/s
- Print columns: 40 to 132
- Character sets: 9 national character sets, 94 displayable ASCII character set, VT100 line drawing set, APL character set
- Characters per inch: 5, 6, 6.6, 8.25, 10, 12, 13.2, 16.5
- Characters: 9 × 9 dot matrix impact printing in text mode, 18 × 9 dot matrix printing in enhanced mode
- Lines per inch: 2, 3, 4, 6, 8, 12, user-selectable
- Universal power supply, user-selectable
- Parity: Switch-selectable to odd, even, mark, or space; 7 or 8 bits per character selectable
- Graphics: 73-330 dots/in horizontal, 72 dots/in vertical (graphics mode variable)
- Extensive self-contained user diagnostics

LA12 Order Codes

Option	Order Code
Compact hardcopy terminal with integral 1200-baud dial-through-the-keyboard modem, 300-baud coupler, EIA interface, and carrying case.	LA12-A*
LA12 with integral 300-baud acoustic coupler, EIA interface, and carrying case.	LA12-CB
LA12 tabletop and console model with EIA interface only.	LA12-DB
Dial-through-the-keyboard 1200-baud integral modem upgrade for LA12-CB, LA12-DB.	LAX12-U2
300-baud acoustic coupler upgrade for LA12-DB.	LAX12-U4
Enhanced microcode upgrade for LA12-A, LA12-B, LA12-C, and LA12-D.	LAX12-U5

*LA12-A may not be suitable for use in all sections of Europe. Check with your local marketing representative.

LQP03

The LQP03 letter-quality printer is a desktop full-character impact printer designed for use with all of Digital's personal computers, word processors, workstations, and video terminals. The affordable LQP03 includes an expanded character set contained on a single 130-petal daisywheel. The daisywheel lets you use all of Digital's multinational characters on one wheel, and gives you scientific, mathematic, or other special characters on another.

The printer produces graphics such as pie and bar charts, and line graphs, with a Daisy-Aids™ software package. An optional bidirectional forms-tractor is customer-installable and handles a variety of fanfold paper including continuous preprinted forms. It permits the paper to be scrolled forward or backward while printing. The single-tray cutsheet feeder option is designed to automatically feed precut paper to the LQP03 in either portrait or landscape fashion.

The LQP03 runs on a variety of Digital operating systems and layered software products, plus software packages from other manufacturers. Depending on your software support, the LQP03 can also perform overprinting, bolding, underlining, subscripting, and superscripting. The LQP03 includes a standard serial interface for compatibility with existing Digital printers.

Performance Characteristics

- Baud rates: 110, 200, 300, 600, 1200, 2400, 4800, or 9600 bits per second
- Print speed: 25 characters per second (Shannon text at 10 pitch)
- Print method: impact, daisywheel
- Print columns: 165 at 15 pitch maximum
- Characters per inch: variable, (10 char/in default)
- Lines per inch: Variable, includes proportional spacing (6 line/in default)
- Margins: left, right, top, and bottom
- Tabs: 256 contiguous horizontal, 168 contiguous vertical
- Paper: Sheets, fanfold, forms
- Universal power supply
- Parity: selectable

LQP03 Order Codes

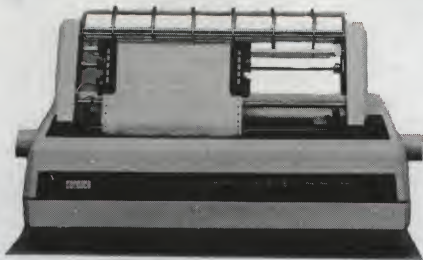
Option	Order Code
Full character, 220-240 Vac/50 Hz letter-quality printer and 130-character printwheel. Nationalized.	LQP03-B*

*Replace the asterisk in the LQP03 order code with the letter that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain	T-Israel	V-Portugal
W-Italian-speaking Switzerland		

Paper Feed Option Order Codes

Option	Order Code
Single tray sheet feeder	LQPX3-SF
Bidirectional tractor	LQPX3-FT

**LQP02**

The LQP02 letter-quality printer is a tabletop full-character impact printer that incorporates daisywheel print technology. This highly reliable, customer-installable terminal will print high-quality hardcopy on regular office stationery as well as fanfold paper up to 14 inches wide for spreadsheet listings. Various character fonts can be used by simply changing printwheels. Daisywheels are inexpensive, easily interchangeable, and available in over 25 type styles and special purpose fonts. Smart bidirectional printing increases speed, particularly over large areas of white space. It operates on full-duplex, asynchronous communication lines and includes a universal power supply and a standard RS232-C interface.

Features

- Baud rate: 110 to 9600 b/s
- Print speed: 32 characters/s (Shannon Text at 10 pitch)
- Print method: Impact, daisywheel
- Print columns: (132 at 10 characters/in), 158 at 12 characters/in)
- Character set: Over 25 different, 7-bit 94 displayable ASCII character set
- Characters per inch: 10-12 variable, software-selectable
- Lines per inch: 6-8 variable, software-selectable
- Variable horizontal tabs and margins
- Paper: fanfold or cutsheet
- Universal power supply, user-selectable
- Parity: Switch-selectable to odd, even, mark, or space; 7 bits per character

LQP02 Order Codes

Option	Order Code
Letter-quality printer with Courier-10 font.	LQP02-AD
Bidirectional forms tractor option for use with fanfold paper.	LQPX2-AA
Dual-tray cutsheet feeder option with envelope tray.	LQPX2-SF

LVP16

The LVP16 is a high-performance color graphics pen plotter that draws on plain paper and transparencies. The LVP16 plotter holds six colored pens for printing up to six colors on paper or transparencies without manual intervention. It is compatible with all of Digital's personal computers and VAX products that support HP-GL graphics protocol. An RS232 interface is standard for the LVP16. An interface cable must be ordered with the plotter.

Features

- Printing speed: 15 ips maximum
- Print quality: .001 in accuracy
- Pen velocity for each axis: 38.1 cm/sec (15 in/sec) max., pen down; 50.8 cm/sec (20 in/sec), pen up.
- Print resolution: .025 mm (.0098 inches)
- Lightweight desk-top design, 16 lbs.
- Paper handling: Prints on both cutsheet plain paper and transparencies
- Colors: 6 of 10 for paper, 6 of 7 for transparencies
- Eavesdrop capability (allows connection to serial printer)
- Highly reliable (MTBF approximately 6 years under normal usage)

LVP16 Order Codes

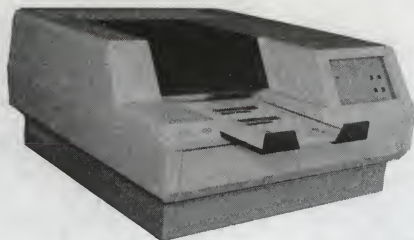
Option	Order Code
Graphics pen plotter with documentation and initial supplies.	LVP16-A*

*Replace the asterisk in the country kit order code with the digit that precedes the desired country/language listed below.

B-Belgium	D-Denmark	E-United Kingdom
F-Finland	G-Germany	H-Netherlands
I-Italy	K-French-speaking Switzerland	L-German-speaking Switzerland
M-Sweden	N-Norway	P-France
S-Spain	W-Italian Speaking Switzerland	T-Hebrew
V-Portugal		

Cable Order Codes

Option	Order Code
For interface to Rainbow and VAX systems.	BCC19-15
For interface to DECmate and PRO series systems.	BCC20-10
Eavesdrop cable for connection to serial printer.	BCC24-05



LCP01

The LCP01 is an ink-jet, color graphics printer that produces high-quality presentation graphics on paper and transparencies. The LCP01 is an intelligent printer that contains its own graphics processor. It handles the display file processing from the CPU. This feature decreases processing time and frees the host CPU for other tasks and applications.

The LCP01 can store up to five fonts in local memory, and offers brilliant output from more than 200 colors. The LCP01 supports ReGIS, GIDIS, NAPLPS, and BIT MAP IMAGE (Color Sixel format) protocols. It is compatible with DECslide, DECgraph, DATATRIEVE office software, VTX, PRO/GIDIS, and third party graphics generation packages.

Features

- Print speed: less than 2 min/copy
- Print resolution: 154 dpi
- Colors: 216
- Image size: A Size (7.5 × 9.5), A4 Size (7.27-9.95)
- Print image resolution: 1536 × 1152 dots (maximum)
- Print colors: Yellow, magenta, cyan, red, green, blue, black, and white
- Diagnostics: Self-text, PDP-11 XXDP +
- RS422, RS232 Serial-line interface
- Less than 55 decibels operating noise
- Desktop size
- Minimal operator intervention and maintenance

LCP01 Order Codes

Option	Order Code
Ink-jet color printer with graphics processor	LCP01-AA
Power Cables	
Continental Europe	LCP01-KG
United Kingdom	LCP01-KE
Switzerland	LCP01-KK



VAXstation II

VAXstation II meets the most stringent demands. It puts the power of a VAX 32-bit virtual memory machine at a desk. Based on the MicroVAX II, it's a high-powered workstation with high-quality graphics. VAXstation II gives up to 9 Mbytes of memory; a 19-inch monochrome graphics display; and all the flexibility, power and networking capabilities professionals have come to expect from Digital's VAX computers.

VAXstation II runs MicroVMS software—an operating system that takes full advantage of the VAX 32-bit architecture. And because it's a VAX family member, it is fully compatible with other VAX computers.

In addition to the GKS application interface, there are also two software terminal emulators, one for Digital's VT100 and another for the Tektronix 4014.

Multiple VT100 windows on a single screen are a software developer's dream. Imagine having a compiler running in one window, looking at the output of the debugger in another, while editing the source listing on a remote system via DECnet in a third window—all processes running on a MicroVAX II CPU with a single 19 inch monitor.

This continuity in graphics architecture from one generation of product to another protects application investments as Digital enhances its MicroVAX workstation products. The window management features are the same. The graphics software interface is the same. The only change the application will see is the greatly increased processing power.

Features

- A single-user system that incorporates the MicroVAX II microprocessor—high-performance 32-bit VAX architecture in a graphics workstation.
- Compatible with all other VAX computing environments—from MicroVAX to the VAX 8600.
- Up to 9 Mbytes of high-speed memory.
- High-resolution graphics—1,024 (horizontal) by 864 (vertical) picture elements (pixels) viewed on 19-inch screen.
- Powerful, general purpose MicroVMS operating system with most of the same features as the larger VAX systems.
- Extensive and expansive networking with full distributed processing capabilities.
- Multiwindowing for controlling and viewing multiple tasks that are executing concurrently.
- All major programming languages available. Ability to call routines written in one language for a program written in another.
- Fastest floating-point accelerator in its class.
- Standard Q-bus hardware compatibility with a quad-form factor of 8.4 inches by 10.5 inches.
- VT100 and Tektronix 4014 terminal emulation for access to the many existing VAX-based software applications.
- Optional printers that produce cost-effective printouts of graphics and text directly from your terminal screen.

System highlights

The VAXstation II graphics workstation packages include:

- Micro VAX II processor with standard 2 or 3 Mbytes main memory.
- Floating-point accelerator coprocessor.
- 1K x 2K bit-mapped video graphics subsystem.
- Standard Ethernet (DECNA) interface.
- Dual 5¼-inch 400-Kbyte floppy disks and/or 95 MB cartridge tape.
- Internal 5¼-inch, 31-Mbyte or 71-Mbyte Winchester disk; an optional external 31 Mbytes can give you up to 102 Mbytes mass storage.
- 19-inch, 60-hertz, noninterlaced monochrome monitor.
- Mouse pointing device with three function buttons.
- Keyboard with 15 special-function keys.
- MicroVMS base-system software license.
- MicroVMS workstation software license.
- GKS graphics programming interface license.
- Tilt-and-swivel monitor stand.
- 8 slot (BA23) or 12 slot (BA123) box.
- Maximum of 9Mb main memory.
- Optional DECnet software license.
- Optional laserprinter or dot-matrix impact printer.
- Optional DZQ11 or DHV11 Asynchronous interface.
- Optional VMS layered products.

Configuration

VAXstation II is available as three packaged systems:—

SV-LV52A-EN

- MicroVAX II CPU with Floating Point Coprocessor, 2MB of memory.
- 8 slot Box (BA23).
- RD52 31MB Disk.
- RX50 dual 400 KB floppy disk drive.
- DECNA Ethernet interface.
- QVSS video subsystem.
- VR260 19" monochrome monitor.
- LK201-AA standard keyboard.
- VAXstation 3-button mouse.
- Micro VMS/workstation software license.
- Workstation software license.
- GKS-0b license.

SV-LV55A-EN

- MicroVAX II CPU with Floating Point Coprocessor, 2MB of memory.
- 8 slot Box (BA23).
- RD53 71MB Disk.
- TK50 95MB Cartridge Tape.
- DECNA Ethernet interface.
- QVSS video subsystem.
- VR260 19" monochrome monitor.
- LK201-AA standard keyboard.
- VAXstation 3-button mouse.
- MicroVMS/workstation software license.
- Workstation software license.
- GKS-0b license.

SV-LV55B-EN

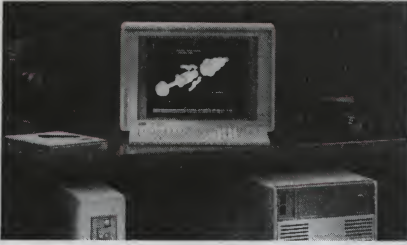
- MicroVAX II CPU with Floating Point Coprocessor, 3MB Main Memory.
- 12 slot Box (BA123).
- RD53-71MB Disk.
- RX50-dual 400 KB floppy disk drive.
- TK50-95 MB Cartridge Tape.
- DEQNA Ethernet Interface.
- QVSS Video Subsystem.
- VR260 19" Monochrome Monitor.
- LK201-AA Standard Keyboard.
- VAXstation 3-button Mouse.
- MicroVMS/Workstation Software License.
- Workstation Software License.
- GKS-0b License.

Configuration information

Refer to MicroVAX II (page 1.62) for details.

Note: The QVSS subsystem has the following power requirements:

<u>@ + 12 V</u>	<u>@ + 5 V</u>
0.5A	3.5A



VAXstation 520

The VAXstation 520 gives you the best in technical computing. You get the advanced graphics capabilities that you've come to expect from a high-performance graphics workstation. It offers Tektronix* 4125 compatibility, which includes features such as segment processing, true pan and zoom, arc drawing, and multiple viewport support. These features make schematic, IC design, drafting, electrical and mechanical CAD applications, and earth resource applications, such as mapping and seismic interpretation, easier to work with and increase the productivity of your programmers and end users. And there's more. Our powerful 2D VAXstation 520 workstation offers 3D performance upgrades—3D wireframe and the more sophisticated 3D solid shading.

Features

- VAXstation 520 is a complete stand-alone, high-resolution color graphics workstation.
- Based on the MicroVAX II computer, the MicroVMS operating system and the Tektronic 4125 graphics subsystem, the VAXstation 520 combines the strengths of VAX architecture, VAX performance, and VAX compatibility with Tektronix graphics expertise into a powerful, single-user workstation.
- Full graphics compatibility with Tektronix 4125 and VAX/VMS systems gives you access to an enormous number of world-class application programs.
- Two bits planes for four displayable colors are standard. An additional two, four, or six bit planes are available. They enable the simultaneous display of as many as 256 colors from a palette of 16 million.
- A 19-inch screen with a resolution of 1,280 (horizontal) by 1,024 (vertical) pixels provides sharp graphics display.
- The 60-hertz noninterlaced refresh rate and the dynamic convergence correction feature greatly reduce flicker and eye fatigue, and increase clarity of display.
- Hierarchical display list support for segment processing, such as creating and editing, drag, and subroutines; pick operations; independent multiple viewports; pop-up menus; pan and zoom; and arc drawing saves programming time, increases the VAXstation 520's performance, and provides unparalleled design efficiency.
- An optional 3D wireframe upgrade include features such as pan, zoom, and rotation, as well as depth clipping, 3D magnification, and parallel and perspective view selection. All these features offload work from the host.
- An optional 3D solid-shading upgrade contains advanced features such as hidden line and surface removal, translucency, multiple light sources, and different surface-shading techniques that make screen images look three-dimensional and real.
- Ethernet local area networking supported by DECnet software lets you share information and ideas with users other Digital systems.
- The VAXstation 520 color graphics subsystem included in the VAXstation 520 can also be purchased as an option to any MicroVAX and any VAX system—from the VAX-11/725 through the new VAX 8600 computer.

The VAXstation 520 is a fully integrated system and includes all the hardware and firmware a high-productivity workstation demands. All you add are MicroVMS software and your application programs. The workstation includes:

- A MicroVAX II processor with 2 Mbytes of main memory.
- A MicroVMS operating system license.
- A color-graphics subsystem with 256 Kbytes of display-list memory and two bit planes of frame-buffer memory.
- A high-speed, floating point processor.
- A 5.25-inch, 31-Mbyte Winchester disk.
- Dual 5.25 inch, 400-Kbyte floppy disks.
- Ethernet interface.
- A 19-inch, 60-hertz noninterlaced color monitor.
- A low-profile detached keyboard.

And if you need more backplane slots, more memory, more storage capacity or tape backup, there's a MicroVAX II option to meet your need.

VAXstation 520 Options

As your workload grows, so should your system. The VAXstation 520 workstation is no exception. You can choose from a variety of hardware upgrades and options.

- 3D Wireframe Upgrade. (Requires four bit planes of frame-buffer memory.)
- 3D Solid-Shading Upgrade. (Requires 3D wireframe upgrade and eight bit planes of frame-buffer memory.)
- Color copier interface.
- Three-port serial interface.
- 27.9 by 27.9 cm (11 by 11 in) graphic tablet. (Requires three-port serial interface.)
- Additional two, four, or six bit planes of frame-buffer memory.
- Additional 256 or 512 Kbytes of display-list memory.
- Mouse.
- Any MicroVAX II option.
- Color graphics copier. † (Requires color copier interface.)
- Color pen plotter. † (Requires three-port serial interface.)

† Available from Tektronix, Inc.

Because the VAXstation 520 workstation was designed in accordance with ANSI X3.64 standards, you can use a separate alphanumeric plane for text manipulation. By defining a location, you can display menus or communications dialogs in a scrollable dialog area. This keeps the text and graphics separate and lets you use the terminal either as a system console for MicroVAX II or as a graphics device.

Configuration Information

The VAXstation 520 (VS520-AB) is comprised of:

Option	Order Code
MicroVAX II, BA23, 1Mb, floating point	630QY-A3
RD/RX Disk Controller	RQDX2-AA
31Mb Winchester Disk	RD52A-AA
Dual 400Kb Floppy Disk	RX50A-AA
1Mb memory	MS630-AA
Ethernet interface	DEQNA-KB
Hardware Diagnostics and Documentation (RX50)	ZNAAA-C3
1-2 user base MicroVMS license	QZ001-CZ
Graphics Subsystem	VS5XB-AB

Ordering Information

Option	Order Code
VAXstation 520 (240 Volt)	VS520-AB
SPECIFY MicroVAX II POWER CORD	
UK/Ireland	-BN02A-2E
Austria, Belgium, France, Germany, Finland, Netherlands, Norway, Portugal, Spain, Sweden	-BN03A-2E
Switzerland	-BN04A-2E
Denmark	-BN06A-2E
Italy	-BN07A-2E

Hardware Option Order Codes

Option	Order Code
4 Line Async. Mux	DZQ11-DB

Tablet Options

Option	Order Code
11" X 11" Tablet (Europe)	VS5XX-BB
11" X 11" Tablet (UK)	VS5XX-BC
11" X 11" Tablet (Switzerland)	VS5XX-BE

NOTE: The addition of a tablet requires the Three Serial Port Option (VS5XX-AD) as a prerequisite.

**VS520 MicroVAX II
Hardware Options
Additional Memory
(Select 1 Module Max.)**

Option	Order Code
1Mb Parity Memory	MS630-AA
2Mb Parity Memory	MS630-BA
4Mb Parity Memory	MS630-BB

Operating System

Option	Order Code
MicroVMS (1-2) User License	QZ001-CZ
MicroVMS (1-8) User License and Key	QZ002-C3

Documentation & Media

Option	Order Code
MicroVMS Media (RX50) and Documentation (1-2 users)	QZ001-H3
MicroVMS 8 User SPS RX50	QZ002-H3

**LN01**

The LN01 is a nonimpact printer that employs laser technology to produce high quality print. The LN01 prints 12 pages per minute, using electrophotographic imaging and xerographic printing. The print resolution of 300×300 dots per square inch produces perfectly formed characters of even density and alignment.

The printer's low noise level and high-resolution print quality make the LN01 particularly well-suited for office environments, technical environments using PLOTLN graphics, or wherever letter quality is required.

For VAX/VMS systems only, a Soft Font Library is available for use on the LN01 and can be accessed with the LN01 Font Utility. It contains an extensive collection of typefaces designed to satisfy a wide range of printing applications. For convenience, fonts may be purchased in Application Kits including Basic Office, Complete Office, Forms Complement, Technical Scientific, and Presentation Complement. The LN01 Font Utility is required for all font applications except DECpage.

Performance Characteristics

- Printing speed: 12 pages/min maximum
- Resident fonts: Two 188-character fixed-space fonts (default) plus 13 type families
- Print modes: Portrait and landscape
- Print resolution: 300×300 dots per square inch
- Print columns: As many as 256
- Paper handling: Cutsheet plain paper, two 250-sheet cassettes, 1.1-1.6 kg (16-24 lb) paper
- Paper Size: 21×29.7 cm (8.3×11.7 in)
- Noise level: Less than 55 dBA

LN01 Order Codes

Option	Order Code
Non-impact 12-page per minute laser printer with LP11 interface and 9.2-meter (30-foot) cable.	LN01-CB
Non-impact 12-page per minute laser printer with DMF32-compatible 9.2-meter (30-foot). (DMF32 not included)	LN01-DB

Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
LN01-CB	1 Quad Slot	1.5	0.0	0.0	1.0	1

Option	Order Code
Basic Office	
Available typefaces include CG Triumvirate, CG Triumvirate Publishing, Century Textbook, Century Textbook Publishing and OCR-B. Type sizes are available in 10, 12, 14, 18, and 24 picas, depending on the typeface, and come in Roman, Bold or Italic weight.	QA640-CM
Office Upgrade	
Available typefaces include Stymie, Stymie Publishing, ITC Avant Garde Gothic, ITC Avant Garde Publishing, ITC Souvenir, and Souvenir Publishing. Type sizes are available in 10, 12, 14, 18, and 24 picas, depending on the typeface, and come in Bold, Light, Italic, Light Italic, Book, and Demi weight.	QA641-CM
Complete Office	
Contains everything included in both the Basic Office and Office Upgrade packages. This package satisfies all office applications.	QA642-CM
Technical Scientific	
Available typefaces include General Scientific, OCR-B, Century Textbook and CG Triumvirate. Type sizes are available in 10 pitch, and 10, 12, 14, 18, and 24 picas, depending on the typeface. This package comes in Bold, Italic and Roman weight.	QA643-CM
Forms	
Available typefaces include CG Triumvirate and CG Times. Type sizes are available in 6, 8, 9, 10, 11, 12, 14, and 18 picas, depending on the typeface, and come in Bold, Italic and Roman weight. These are typefaces and not forms design software.	QA644-CM
Presentation	
Available typefaces include CG Triumvirate, CG Triumvirate Italic, CG Times, ITC Korinna, Courier, ITC Avant Garde Gothic, Stymie and Futura II. Type sizes are available in 10 pitch, 10, 12, 14, 18, 24, and 36 picas, depending on the typeface, and come in Bold, Roman, Italic, Book, Demi and Light weight.	QA645-CM
Typewriter	
Contains a low-cost variety of fonts for a technical environment. Includes Courier, OCR-B and General Scientific fonts, all in 10 pitch.	QA646-CM
Publishing	
CG Triumvirate.	QA649-CM
Century Basic.	QA650-CM

Additional Character Set Order Codes

Option	Order Code
CG Triumvirate 6 Point: Triumvirate typeface in 6 point Roman, Bold, Italic and Bold Italic.	QA647-CM
CG Times 6 Point: Times typeface in 6 point Roman, Bold, Italic and Bold Italic.	QA648-CM
Courier: Mono-spaced Courier 72 typewriter font in Roman, Bold, Italic, and Bold Italic. This font is also available in the multinational character set.	QA651-CM
General Scientific Character Set: Mono-spaced General Scientific typewriter font in Roman, Bold, Italic, and Bold Italic to be used with MASS-11.	QA653-CM
OCR-B Character Set: Mono-spaced Optical Character Recognition font in Roman and Bold.	QA654-CM

LN01 Font Utility

For most applications, it is necessary to load fonts using the LN01 Font Utility VMS software package. Turn to the LN01 Font Utility entry in this section for a detailed description of this product.

For further product descriptions and ordering information, consult your Digital Sales Representative.

LN01 Fonts

Typeface	Text (8, 10, 12)*	Flex (9, 11, 14)*	Display (18, 24, 30)*	Weights
CG™ Triumvirate	QA-610-CM	QA-611-CM	QA-612-CM	R,B,I,BI
CG™ Times	QA-613-CM	QA-614-CM	QA-615-CM	R,B,I,BI
ITC™ Souvenir	QA-616-CM	QA-617-CM	QA-618-CM	L,M,LI,MI
CG™ Palacio	QA-619-CM	QA-620-CM	QA-621-CM	R,B,I,BI
ITC™ Korinna	QA-622-CM	QA-623-CM	QA-624-CM	Reg., B,K,KB
Stymie	QA-625-CM	QA-626-CM	QA-627-CM	L,B,LI,BI
Futura II	QA-628-CM	QA-629-CM	QA-630-CM	M,B,MI,BI
Baskerville II	QA-631-CM	QA-632-CM	QA-633-CM	R,B,I,BI
ITC™ Avant Garde	QA-634-CM	QA-635-CM	QA-636-CM	BK,M,D,B
Century Textbook	QA-637-CM	QA-638-CM	QA-639-CM	R,B,I

B = Bold
I = Italic
R = Roman

L = Light
M = Medium
K = Kursiv
KB = Kursiv Bold

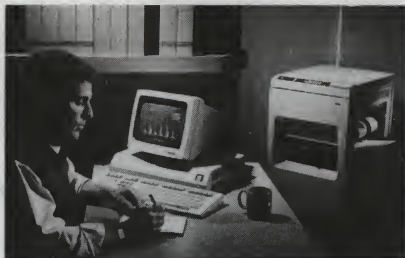
LI = Light Italic
MI = Medium Italic

BI = Bold Italic
Reg. = Regular

*Indicates point size.

CG is a trademark of Compugraphic Corporation.

ITC is a trademark of International Typeface Corporation.

**LN01B**

The LN01B is an LN01 laser printer with PLOTLN software and two EPROMs that delivers multifold text plus Base ReGIS and Calcomp™ graphics. It includes 16 resident graphics-labeling fonts that are used for designating graphics figures including pie and bar charts, and histograms.

Using laser xerographic technology, the LN01B prints one full page at a time, up to a maximum speed of 12 pages per minute. The print resolution of 300×300 dots per square inch produces high-resolution text and graphics. No matter how many pages are printed, the LN01B produces pages of consistently high quality.

Digital's font library packages and individual fonts produce crisp, attractive text. Consult your Digital sales representative for ordering information.

Features

- Printing speed: 12 pages min/maximum
- Print resolution: 300×300 dots per square inch
- Print columns: As many as 132
- Paper handling: Cutsheet plain paper, two 250-sheet cassettes, 1.1-1.6 kg (16-24 lb) paper
- Paper Size: 21×29.7 cm (8.3×11.7 in)
- Noise level: Less than 55 dB
- PLOTLN includes a ReGIS interface that allows Base ReGIS command files to be converted for printing on the LN01B.
- Calcomp™ emulation, included in PLOTLN, allows the use of existing plotter CAD graphics software.
- A complete Courier-like character set of 16 resident graphics-labeling fonts, in four orientations, is standard in PLOTLN.
- Compatible with software developed for the LN01, as well as popular text packages like RS/1 and MASS-11.

LN01B Order Codes

Option	Order Code
Non-impact laser printer includes LP11 interface and 9.2-meter (30-foot) cable. PLOTLN VMS software and EPROMS included.	LN01B-CB
Non-impact laser printer includes DMF32 interface and 9.2-meter (30-foot) cable. PLOTLN VMS software and EPROMS included.	LN01B-DB
Optional Interfaces	
Parallel longline kit for operation up to 1,000 feet from CPU. (Cable is not included and must be ordered from Digital's Peripherals and Supplies Group.) Non-impact laser printer with 9.2-meter (30-foot) cable and long-line interface.	LN01K-AA
Serial RS232 kit.	LN01K-LS

LN01 Font Utility

The LN01 Font Utility is a VAX/VMS layered product designed to aid in the management, development, and usage of fonts for the LN01 Laser Printer on VAX/VMS systems.

The utility provides a mechanism for:

- Editing existing and creating new LN01 fonts.
- Combining text with LN01 fonts in a manner suitable for printing on the LN01 laser printer.
- Obtaining information about a particular LN01 font.
- Obtaining sample output using specified LN01 fonts.

Font File Editing

The LN01 Font Editor is an interactive graphics editor that enables you to create and edit fonts for printing with the LN01 Laser Printer. The editor allows you to design characters and fonts; modifies existing characters and fonts to suit particular printing applications; displays individual characters and information about fonts.

Using the LN01 Font Editor is similar to using a text editor like EDT or other interactive utilities. For example:

- You invoke the Font Editor with the DCL command `FONTS/EDIT` and specify the font file you wish to edit or create. (A font file contains characters in a form that the LN01 software can use for printing.)
- During your editing session, you type DCL-like commands from the keyboard and use keypad functions to access characters and perform editing operations.
- You can use command files, recover your edits from aborted sessions, define private defaults and some keypad functions of your own, and get online help.

LN01 Font and Text Integration

The LN01 Font Utility provides a mechanism for combining a text file with one or more LN01 fonts in a form suitable for printing on the LN01 Laser Printer. It allows you to combine a text file with a specific font and print it on the LN01 Laser Printer.

LN01 Font Information

The LN01 Font Utility provides a mechanism for obtaining information about LN01 font files. Users can get the following information about each file:

- VMS font file name
- Internal font name
- Orientation (portrait or landscape)
- Point size
- Number of lines per inch
- Font file size in bytes
- Number of characters per line (fixed pitch font only)

This feature also decodes the numbers given in the font name to provide the family, and complement number information if the font name conforms to Digital's font file naming conventions.

Configuration Information

Any valid VAX/VMS system, except for the VAX-11/725, configured with an LN01 Laser Printer with 256 Kbytes RAM memory and VAX/LP11 interface.

The LN01 Font Editor requires a VT125 raster graphics terminal.

Font Utility Order Codes

Option	Order Code
LN01 Font Utility. Single use license, binaries and documentation, and support services.	Q†600-A‡
LN01 Font Utility license-only option, no binaries, no documentation, no support services.	Q†600-DZ
LN01 Font Utility documentation kit.	Q†600-DZ
†Replace the dagger in the utility order code with the letter which designates the CPU to be used.	
C-VAX-11/730	D-VAX-11/750
E-VAX-11/780 & 782	
‡Replace the double dagger in the utility order code with the letter which precedes the media to be used.	
G-VAX-11/730, or 750 with TU58 tape cartridge	M-VAX-11/730, 750, or 782 with 9-Track 1600 bpi magtape
Y-VAX-11/780 with RX01 floppy disk	

PLOTLN

PLOTLN includes a library of FORTRAN subroutines that can be called from any language that supports the VMS calling conventions. These routines directly produce graphics on the LN01 Laser Printer from a user written program. These subroutines have the same format and function as the subroutines commonly used with Calcomp plotters. Existing software that uses standard Calcomp subroutine calls can output to the LN01 by using the /PENPLOT option of the PLOTLN Command Verb.

PLOTLN also includes a ReGIS Interface that allows Base ReGIS command files to be converted for printing on the LN01. Any graphics software that produces ReGIS output can use PLOTLN to print graphics on the LN01, with the following restrictions:

- PLOTLN uses character fonts to product displayed text. Because of this, PLOTLN can produce only text in a limited number of sizes and orientations. PLOTLN uses the font that is closest to the text requested. Specifically, PLOTLN can product Courier text in four orientations (portrait, landscape, inverse portrait, and inverse landscape) and in four point sizes: 7, 10, 14, 16.)
- The LN01 is a hardcopy output device and does not support dynamic features such as erase and blinking that are often used on graphic terminals. Requests for these options are accepted by PLOTLN but are ignored.
- PLOTLN currently translates only the Base ReGIS Instructions. Other ReGIS instructions are ignored. Software packages that produce output using extended ReGIS for laser CRT graphic devices may yield different results when using PLOTLN than when using a graphics terminal. For example, PLOTLN ignores the Multiply sub-option of the Text command. To produce the desired results from a ReGIS file that uses the Multiply sub-option, the user must edit the ReGIS file and substitute the Size sub-option for the Multiply sub-option.

The /REGIS option of the PLOTLN Command Verb allows users to specify the location, size, and orientation of the graphic image on the page. The image is automatically magnified or reduced to fill the specified area of the page. This allows integration of the graphic image into a page of text. The integration is possible with any text composition software, such as DEC Standard Runoff, that allows literal data to be included from a file. The text composition software must also provide a way to load PLOTLN graphic fonts along with the text fonts used, or it must restrict itself to the ROM resident text fonts.

Features

- Converts generic graphic display descriptions to the graphic characters needed to produce graphic images on the LN01.
- Supports the conversion of ReGIS picture files into data files that produce equivalent pictures on the LN01.
- Allows any VMS programming language to produce graphics on the LN01 by calling the underlying PLOTLN subroutines. PLOTLN's call interface is directly compatible with the Calcomp interface used for CAD/CAM applications.
- Supports the integration of text and graphics on a single page when used with a text editor that allows literal data to be included from a file.
- Allows a viewport size and location to be defined for each output display file. The graphic display will automatically be expanded or reduced to fill up the defined viewport, allowing easy integration of the display into a page with text or other graphic images.
- Supports a metafile facility that allows a selected portion of an original picture to be independently sized and displayed.
- Allows any software that produces Base ReGIS or Calcomp output to use the LN01 Page Printer as a graphics hardcopy device.
- Includes specially designed text fonts in four orientations and four type sizes that allow text in different orientations to appear on the same page.

PLOTLN Order Codes

Option	Order Code
PLOTLN software and fonts, documentation, DEC14 EPROMS.	QA778-CM

LP25

Standard LP25 lineprinters use a 64-character font band and are equipped with a control unit, 9.2-meter (30-foot) cable, and a universal power supply. The LP25 features easy-to-change, user-replaceable font bands for compressed printing mode in European and Japanese character sets. For information on optional character bands, refer to the *Terminals & Printers Handbook*.

Performance Characteristics

- Printing speed: 64-character set: 300 lines/min, 96-character set: 215 lines/min
- Number of columns: 132
- Horizontal spacing: 0.25 cm (0.1 in), 10 characters/in or 15 characters/in compressed. Compressed font decreases throughput by 30 percent.
- Vertical spacing: 6 or 8 lines/in, switch-selectable
- Vernier adjustment for both horizontal and vertical paper tension
- Slew speed: 37.5 cm/s (15 in/s)
- Buffer capacity: 132 characters
- Program status display
- Self-test capability

LP25 Order Codes

Option	Order Code
Q-bus Lineprinters	
LP25 Q-bus lineprinter, 215 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-PLUS.	LPV11-AV
LP25 Q-bus lineprinter, 300 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-PLUS.	LPV11-BV
LP25 Q-bus lineprinter, 215 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	LPV11-AW
LP25 Q-bus lineprinter, 300 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with (MicroPDP-11 and MicroVAX II) BA23.	LPV11-BW
LP25 Q-bus lineprinter, 215 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-S, and MicroVAX II with BA123.	LPV11-AX
LP25 Q-bus lineprinter, 300 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-S, and MicroVAX II with BA123.	LPV11-BX

Option	Order Code
UNIBUS Lineprinters	
LP25 UNIBUS system option, 300 lines per minute for 64-character set.	LP11-AA
LP25 UNIBUS system option, 300 lines per minute for 64-character set, or 215 lines per minute for 96-character set.	LP11-BA
DMF32-compatible Lineprinters	
LP25 lineprinter, 300 lines per minute for 64-character set. 9.2-meter (30-foot) cable is included.	
<i>Prerequisite:</i> DMF32	LP32-AA
LP25 lineprinter, 300 lines per minute for 64-character set. 215 lines per minute for 96 character set. 9.2-meter (30-foot) cable is included.	
<i>Prerequisite:</i> DMF32	LP32-BA
Long-line Lineprinters	
LP25 lineprinter, 300 lines per minute for 64-character set. Hex-size controller and a 15.2-meter (50-foot) cable are included. Other versions available, refer to list.	LSP25-CA

Other Character Band Order Codes

Option	Order Code
64-character set for the United Kingdom	LSP25-AA
64/96-character set for the United Kingdom	LSP25-BA
64-character set for Germany	LSP25-DC
64-character set for Sweden/Finland	LSP25-DD
64-character set for Denmark/Norway	LSP25-DE
64-character set for US DPCB	LSP25-DG
64-character set for Spain/Portugal	LSP25-DS
64/96-character set Germany	LSP25-EC
64/96-character set Sweden/Finland	LSP25-ED
64/96-character set Denmark/Norway	LSP25-EE
64/96-character set for US DPCB	LSP25-EG
64/96-character set for Spain/Portugal	LSP25-ES

Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
LP11-AA	1 Quad Slot	1.5	0.0	0.0	1.0	1
LP11-BA	1 Quad Slot	1.5	0.0	0.0	1.0	1
LP32-AA	DMF32	0.0	0.0	0.0	0.0	
LP32-BA	DMF32	0.0	0.0	0.0	0.0	



LP26

The standard LP26 lineprinters are equipped with a 64-character band, control unit, a 9.2-meter (30-foot) cable, and a universal power supply. The LP26 produces clearly printed lines on pin-feed or continuous paper, and on fanfold forms. A flat, steel font band with raised letters and a collection of 132 hammers for striking selected characters on the band is used on the LP26. The LP26 lineprinter features easy-to-change, user-replaceable font bands for American and European character sets. For information about optional character bands, refer to the *Terminals & Printers Handbook*.

Performance Characteristics

- Printing speed: 64-character set: 600 lines/min, 96-character set: 445 lines/min
- Number of columns: 132
- Horizontal spacing: 0.25 cm (0.1 in)
- Vertical spacing: 6 or 8 line/in, switch-selectable
- Vernier adjustment for both horizontal and vertical paper tension
- Slew speed: 37.5 cm/s (15 in/s)
- Line advance time: 25 msec
- Buffer capacity: 132 characters, single-line
- Self-test capability
- Paper type: Pin-feed, continuous, fanfold forms
- Copies: 1- to 6-part plus carbon paper
- Maximum paper thickness: 0.056 cm (0.022 in)
- Modular design for easy parts removal/replacement during routine servicing and maintenance
- Reliable, medium-load performance

Option	Order Code
Q-bus Lineprinters	
LP26 Q-bus lineprinter, 445 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-PLUS.	LPV11-EV
LP26 Q-bus lineprinter, 600 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-PLUS.	LPV11-FV
LP26 Q-bus lineprinter, 445 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with (MicroPDP-11 and MicroVAX II) BA23 box.	LPV11-EW
LP26 Q-bus lineprinter, 600 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with (MicroPDP-11 and Micro VAX II) BA23 box.	LPV11-FW
LP26 Q-bus lineprinter, 445 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-S, and MicroVAX II with BA123.	LPV11-EX
LP26 Q-bus lineprinter, 600 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included. For use with PDP-11/23-S, and MicroVAX II with BA123.	LPV11-FX
UNIBUS Lineprinters	
LP26 UNIBUS lineprinter, 600 lines per minute for 64-character set. Controller and 9.2-meter (30-foot) cable are included.	LP11-EA
LP26 UNIBUS lineprinter, 600 lines per minute for 64-character set, or 445 lines per minute for 96-character set. Controller and 9.2-meter (30-foot) cable are included.	LP11-EB
Other Character Bands	
64-character set for the United Kingdom	LSP26-AA
64/96-character set for the United Kingdom	LSP26-BA
64-character set for Germany	LSP26-DC
64-character set for Sweden/Finland	LSP26-DD
64-character set for Denmark/Norway	LSP26-DE
64-character set for US DPCB	LSP26-DG
64-character set for Spain/Portugal	LSP26-DS
64/96-character set Germany	LSP26-EC
64/96-character set Sweden/Finland	LSP26-ED
64/96-character set Denmark/Norway	LSP26-EE
64/96-character set for US DPCB	LSP26-EG
64/96-character set for Spain/Portugal	LSP26-ES

LP27

The LP27 lineprinter features standard 96- and 64-character American print bands for printing up to 800 lines per minute or 1200 lines per minute respectively. The bands are easy to change and replace.

Designed for use on larger UNIBUS systems in a standard computer room environment, the LP27 uses continuous fanfold paper and 1–6 part forms in a wide range of widths (8.8 to 47.6 centimeters, 3.5 to 18.75 inches), lengths (7.6 to 37.4 centimeters, 3 to 14.75 inches), and weights (6.8-kilogram bond to 0.05-centimeter card stock, 15-pound bond to 0.02-inch card stock). The LP27-DA, the long-line version of the LP27, is available for operating the printer up to 304.7 meters (1000 feet) from the host. A 15.2-meter (50-foot) cable is included with the lineprinter to permit testing during installation and local operation.

For information on optional character bands, refer to the *Terminals & Printers Handbook*.

Performance Characteristics

- Printing speed: 64-character set at 1200 line/min (maximum), 96-character set at 800 line/min
- Number of columns: 132
- Horizontal spacing: 10 characters/in
- Vertical spacing: 6 or 8 lines/in, switch-selectable
- Slew speed: 127 cm/s (50 in/s)
- Line advance time: 14 msec maximum
- Buffer capacity: 132 characters, single-line
- Self-test capability: Yes (three modes)
- Paper type: Pin-feed, continuous fanfold forms
- Copies: One to six-part plus carbon paper
- Paper thickness: 6.8 kg bond (15 lb bond) to 0.05 cm card stock (0.02 in card stock)

UNIBUS Lineprinter Order Codes

Option	Order Code
LP27 lineprinter with 9.5-meter (30-foot) data cable and controller.	LP27-UB

Long-line Lineprinter Order Codes

Option	Order Code
LP27 lineprinter with 15.2-meter (50-foot) data cable and long-line controller. The long-line controller permits operation up to 304.7-meter (1000-foot) from the host processor with optional cables.	LP27-DB

DMF32-compatible Lineprinter Order Codes

Option	Order Code
LP27-DB parallel port cable. <i>Prerequisite:</i> DMF32	BC27A-30

Other Character Band Order Codes

Option	Order Code
64-character set for the US	LP27X-AA
96-character set for the US	LP27X-AB
64-character set for the United Kingdom	LP27X-BA
96-character set for the United Kingdom	LP27X-BB
64-character set for Germany	LP27X-CA
96-character set for Germany	LP27X-CB
64-character set for Sweden/Finland	LP27X-DA
96-character set Sweden/Finland	LP27X-DB
64-character set Denmark/Norway	LP27X-EA
96-character set Denmark/Norway	LP27X-EB
64-character set for Spain/Portugal	LP27X-SA
96-character set for Spain/Portugal	LP27X-SB

Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
LP27-UB	1 Quad Slot	1.5	0.0	0.0	1.0	1
LP27-DB	1 Hex Slot	2.0	0.0	1.0	1.0	1



LXY Lineprinter

The LXY12 and LXY22 graphics lineprinters are versatile dot-matrix printers that combine the benefits of a line printer and a plotter in one product. These printers are compatible with all of Digital's line printers, requiring no special software to use them as lineprinters.

These system printers can be connected to the system using an LP11 controller or a serial RS232-C port. The LP11 controller offers faster parallel throughput and full data transfer speeds. The RS232-C interface provides remote connection to the host via a serial line interface and modems or standard null modem cables.

Software Packages

PLXY Graphics Software Package gives RT-11, RSX-11M, RSX-11M-PLUS, and RSTS/E, users the ability to produce graphs, charts, bar charts, designs, plots, and line drawings.

BCP Bar Code/Block Character Graphics Software Package gives RSX-11M users the ability to produce Code 39 barcode, block characters, horizontal and vertical thick and thin lines, horizontal and vertical bars, 0.25 cm (0.1 in) text characters and variable sized characters.

Performance Characteristics

- Printing speed (based on parallel interface): LXY12: 300 lines per minute (64 uppercase character), 240 lines per minute (underlines, upper/lowercase characters with descenders), 170 lines per minute (double-height characters)
LXY22: 600 lines per minute (64 uppercase characters), 465 lines per minute (underlines, upper/lowercase characters), 320 lines per minute (double-height characters)
- Plotting speed: LXY12: 42.4 centimeters per minute (16.7 inches per minute)
LXY22: 84.6 centimeters per minute (33.3 inches per minute)
- Character set: 96 ASCII standard (expansion to 192 characters optional)
- Paper slew speed: LXY12: 20.3 centimeters per second (8 inches per second)
LXY22: 40.6 centimeters per second (16 inches per second)
- Buffer capacity: 132 characters

LXY Order Codes**Option****Order Code**

UNIBUS 300 lines per minute dot matrix graphics lineprinter with 9.2-meter (30-foot) cable, pedestal with basket, paper guide, and LP11 controller.

LXY12-CB

UNIBUS 600 lines per minute dot matrix graphics lineprinter with 9.2-meter (30-foot) cable, pedestal with basket, paper guide, and LP11 controller.

LXY22-CB

300 lines per minute dot matrix graphics lineprinter with cable for interfacing to a RS232-C serial port, pedestal with basket, and paper guide.

LXY12-DB

600 lines per minute dot matrix graphics lineprinter with cable for interfacing to a RS232-C serial port, pedestal with basket, and paper guide.

LXY22-DB

Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn	I/O Panel Units
		+5V	+15V	-15V		
LXY12-CB	1 Quad Slot	1.5	N/A	N/A	1.0	1
LXY22-CB	1 Quad Slot	1.5	N/A	N/A	1.0	1
LXY12-DB	Serial Port	N/A	N/A	N/A	N/A	N/A
LXY22-DB	Serial Port	N/A	N/A	N/A	N/A	N/A
LXY12-EB	DMF32	N/A	N/A	N/A	N/A	N/A
LXY22-EB	DMF32	N/A	N/A	N/A	N/A	N/A

Software must be specified when ordering hardware. The following is the PLXY Graphic Software and the BCP Bar Code/Block Character Graphics Software ordering information. Refer to the Software section of this catalog for further details about these software packages.

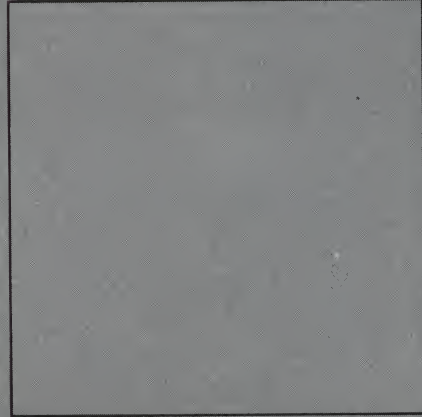
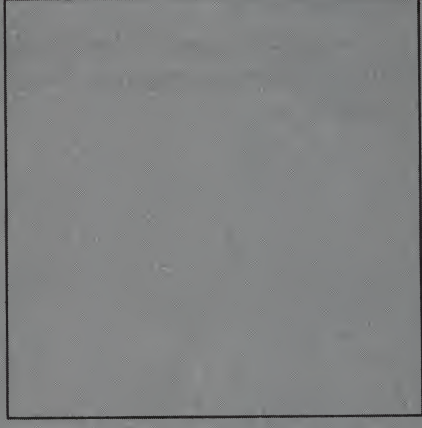
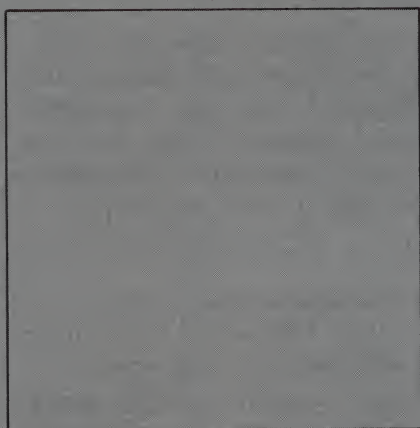
Operating System	Media	Order Codes
RSX-11M	9-track magtape (800 b/in)	QJS05-AD
	9-track magtape (1600 b/in)	QJS05-AM
	RL01	QJS05-AQ
	RX01	QJS05-AY
	RL02	QJS05-AH

Operating System	Media	Order Codes
RSX-11M	9-track magtape (800 b/in)	QJS90-XD
	9-track magtape (1600 b/in)	QJS90-XM
	RL01	QJS90-XQ
	RX01	QJS90-XY
RSX-11M-PLUS	9-track magtape (800 b/in)	QJS95-XD
	9-track magtape (1600 b/in)	QJS95-XM
RSTS/E	9-track magtape (800 b/in)	QJS92-XD
	9-track magtape (1600 b/in)	QJS92-XM
	RL01	QJS92-XQ
RT11	9-track magtape (800 b/in)	QJS91-XD
	9-track magtape (1600 b/in)	QJS91-XM
	RL01	QJS91-XQ
	RX01	QJS91-XY

The first step in the design process is to identify the user requirements. This is done by interviewing the users and observing their work. The next step is to analyze the requirements and determine the system architecture. This is done by creating a system architecture diagram and a data flow diagram. The third step is to design the system components. This is done by creating a component design diagram and a data structure diagram. The fourth step is to implement the system. This is done by writing the code and testing the system.

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Product Description

Digital's personal systems—Rainbow 100B, Rainbow 100+, Rainbow 190, DECmate III and DECmate II—specialize in application software ranging from industry-standard CP/M and MS-DOS personal computing applications to specialized Digital-developed office automation packages. The Professional 300 Series Computers, Digital's personal PDP-11s, offer minicomputer power, applications, and operating environments in a compact desktop workstation.

Because these computers can run a wide variety of software, they can address a complete range of personal computing needs. The Rainbow 100 Series, for example, combines 8-bit and 16-bit CP/M-86/80 and MS-DOS software to run the broadest spectrum of popular personal computing applications. DECmate II uses 12-bit WPS-8 and COS-310 8-bit CP/M software for powerful word processing, office management, and accounting applications. The Professional 300 Series offers a number of operating systems, including P/OS (a subset of RSX-11M-PLUS), RT-11, PRO/VENIX, CP/M, and others. This flexibility makes the Professional ideal in a distributed processing environment.

Common Hardware Components

All three desktop computer series have the same keyboard and monitor, along with the diskette drive, optional Winchester disk (except for the Rainbow 100+ which has a standard Winchester disk), printers, and other major components. The primary differences between these personal systems are the computer's system board, and the type of software they support. A minimum working hardware configuration consists of a keyboard, a system unit, a monitor and system software.

The common components utilized by the personal computer series are:

- Monitor—30.5 cm (12 in) monochrome or 33 cm (13 in) color display featuring 24 lines 80- or 132-character column width and bonded, anti-glare screen.
- Keyboard—105-key low-profile keyboard with 1.9 m (6 ft) coiled cable. Available in foreign-language models with country-specific keycap legends, documentation and power cords.
- System unit—Computer cabinet containing the system board with logic, memory, communication circuitry, option slots for that particular system, and storage devices.

- Diskette drive—5-inch dual-floppy diskette drive with 800 Kbytes of on-line storage contained on two diskettes (400 Kbytes each).
- Hard-disk drive—5-inch Winchester hard-disk drive.
- Floorstand—Optional vertical stand for mounting the system unit on the floor next to your desk in order to free more desktop space.
- Printers—A choice of dot-matrix and daisywheel printers for Digital's personal systems: the LA50 Personal Printer, the Letterprinter 100, and the LQP02 and LQP03 Letter-Quality Printers.
- Ports—All of Digital's personal systems feature a built-in serial printer port and RS232-C communications port in the back of the system unit. These ports simplify printer and communication line hook-up. In addition, the universal power supply features a switch-selectable 115 or 230V setting for international operation.

Installation

Configuring Digital's personal systems is easy. There are very few rules to follow, and all standard and optional components are designed for easy installation and removal. The system unit, for example, features a slide-out mechanism for the system board and diskette/hard disk drives. These same components are installed by sliding them along a rail until they snap in place. Similarly, the system unit cover and power supply are removed by releasing tabs and lifting them up from the system unit chassis.

Depending on the computer, option modules are slide-mounted into slots or snapped onto the system board. The Professional 300 Series has an option-module cage located on the rear portion of the system board. Modules are installed by sliding them in lengthwise along rails, from an opening on the right side of the system unit chassis, and are secured by a locking lever. Module cables plug into slots located along the top of each module. Option modules for the Rainbow 100 series and DECmate II plug into designated locations on the system board.

Product Description

Rainbow is Digital's personal computer. Its superb design—inside and out—will help users be more productive and will make their jobs easier. Rainbow personal computers can also help you use your VAXES more efficiently.

As part of a total Digital solution to your computing needs, the 16-bit Rainbow functions as a stand-alone desktop system as well as an extension of a larger system, such as VAX distributed database or an ALL-IN-ONE Office Information System. Rainbow can stretch your VAX by providing a better distribution of tasks across machines. Individual tasks such as spreadsheets and word processing are handled by the personal computer, while shared tasks (such as corporate database management) and other intensive tasks are handled by your larger computer. This gives users high availability for most-used functions. The host is used only by users who need shared data, since local functions do not depend upon host port availability.

With more than 1,500 industry-standard MSTM-DOS and CP/MTM software applications to choose from, the Rainbow is ideal for many different markets. Its communications capability makes the Rainbow particularly valuable in business environments. Educators will find Rainbow an advantageous choice for faculty and students.

A Rainbow can talk to another personal computer, interactively to a host or information network (giving you dial-in access to public information systems, like Dow Jones/RetrievalTM and The SourceTM) or as a terminal to a host.

Each Rainbow is a complete system, with enough memory and storage capacity to do real work from the start. A Rainbow comes standard with features that are extra-cost options on most competitors' personal computers—a drive for two diskettes, printer port, communications port, and built-in VT102 terminal emulation.

Advanced features like memory-mapped video, which repaints the screen very fast as you work, provide high performance. Rainbow's 132-column display capability, especially important for financial spreadsheet applications, lets you see more information at a time on the screen.

With the self-teaching computer-based instruction (included with the CP/M operating system), "Learn Rainbow," the computer novice can learn how to use a Rainbow personal computer in as little as 90 minutes. The on-screen course is designed in modules, so users can learn at their own pace and review at any time in the future any sections they wish. A number of software packages come with on-screen tutorials as well, and Digital offers CBI packages for some applications that don't.

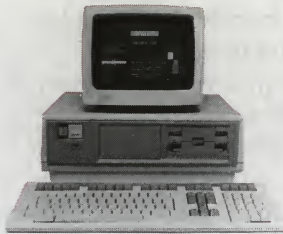
The Rainbow personal computer is available in three different models:

- Rainbow 100B, a floppy-based system
- Rainbow 100+, a Winchester-based system
- Rainbow 190, a top-of-the-line workstation

Rainbow 100B



The floppy-based Rainbow 100B personal computer is targeted toward users who deal with low to medium volumes of data, and who plan to run single applications, one task at a time, today. Many small business owners, managers and professionals in large companies, students, and others will find that the Rainbow 100B's capabilities meet or exceed their needs.



The Winchester-based Rainbow 100 +, on the other hand, gives you the ability to process large amounts of data rapidly. Operating systems and applications can be placed directly onto the hard disk, reducing the need to handle diskettes while accelerating system boot and program access times. Switching from one program to the next is effortless and practically instantaneous. There is also substantial room for file storage, so users can create and manage large databases or integrate documents and data from diverse sources into a single file. Multiple applications and multi-tasking are easily accommodated. Some programs such as word processors and database managers run faster with a hard disk, and some newer applications require a hard disk.

Rainbow 190

The Rainbow 190 is a top-of-the-line office workstation for users who need the superior capabilities of the Rainbow personal computer tightly integrated with their VAX departmental office system. A conveniently packaged hardware and software offering the rainbow 190 gives users the ability to create electronic mail locally, the sophistication of Digital's WPS-PLUS/Rainbow word processing software and the choice of MS-DOS personal computer applications along with the processing, storage, and communications capabilities of the VAX/VMS and ALL-IN-1 Information Systems.

The Rainbow 190 system includes

- A standard Rainbow 100 + system unit
- Choice of monochrome video monitor
- Rainbow Office Workstation software—for integrating the worlds of Rainbow and VAX
- WPS-PLUS/Rainbow word processing software—for standard Digital word processing
- 640 Kbytes of system memory
- MS-DOS V2.11 operating system
- The "Gold Key" keyboard—designed for Digital word processing and office automation systems
- Technical character set—for displaying special scientific and technical characters on screen

Clearly targeted toward VAX customers, the Rainbow 190 extends the power and performance of the Winchester-based Rainbow 100 +. The Rainbow Office Workstation software included with the Rainbow 190 system provides users with easy-to-use communications procedures for both interactive and unattended operations such as transparently exchanging information between Rainbow and VAX, automatically backing-up and restoring local files to the VAX, and picking up and delivering mail created locally on the Rainbow.

*Which System Is right
For Your Needs?*

All three Rainbow family members are fully compatible and offer a set of capabilities designed to satisfy different levels of user needs. You can easily upgrade from a Rainbow 100B to a 100 +, or from a 100 + to a 190 without abandoning your previous hardware or software purchases.

To upgrade from a Rainbow 100B to a Rainbow 100 + simply add a 10-Mbyte internal Winchester disk. Since this is the only difference between the two system units, the need for storage and price will be deciding factors in choosing between the Rainbow 100B and the 100 +.

The general purpose option slot needed to accommodate hardware options from third party vendors is already taken up by the 10-Mbyte Winchester controller in the 100 + and Rainbow 190. The Rainbow 100B offers greater flexibility for adding third-party options.

Expansion

The three option slots included on the Rainbow system module allow the addition of the graphics option; increased memory up to 896 Kbytes; an 8087 numeric coprocessor; additional dual-diskette drive floppy storage or an internal hard disk or a third-party option or the extended communications option. Rainbow users can easily add on options as their needs grow.

For users who have a Rainbow 100A (PC100-A) today, Digital continues to offer hard-disk upgrade kits, increased memory expansion, and other options also available to 100B and 100+ users.

Rainbow Hardware

*Base System Components for Rainbow
100B and Rainbow 100+, and
Rainbow 190*

Rainbow 100B Order Codes

Option	Order Code
Rainbow 100B System Unit with country kit. Has 128 Kbytes of memory, Z80A and 8088 CPUs, dual-diskette drive, factory-installed ROM chip that supports three languages, communication port, printer port, and power supply. Built-in VT102 terminal emulation. Includes monochrome monitor cable and BCC14-10 cable for printer or modem.	PC100-B*

*Replace the asterisk in the Rainbow 100B order code with the number that precedes the desired countries/languages set listed below.

3 – English, French, and German	4 – English, French, and Dutch	5 – English, Swedish, and Finnish
6 – English, Danish, and Norwegian	7 – English, Spanish, and Italian	

Option	Order Code
5-Mbyte Winchester disk option.	RCD50-BA
10-Mbyte Winchester disk option.	RCD51-BA
5 ¹ / ₄ -inch, 800-Kbyte dual-diskette drive.	RX50-XA
Extended communications option.	PCIXX-BB

Rainbow 100+ Order Codes

Rainbow 100+ system unit. Has 128 Kbytes memory, Z80A and 8088 CPUs, 10-Mbyte hard disk, dual-diskette drive, factory-installed ROM chip that supports three languages, comm port, printer port, and power supply. Built-in VT102 terminal emulation. Includes monochrome monitor cable and BCC14-10 cable for printer or modem.

PC100-P*

*Replace the asterisk in the Rainbow 100+ order code with the number that precedes the desired countries/languages set listed below.

3 – English, French, and German	4 – English, French, and Dutch	5 – English, Swedish, and Finnish
6 – English, Danish, and Norwegian	7 – English, Spanish, and Italian	

Option

Order Code

Keyboards

Keyboard for PC100, and system documentation. Includes 6-foot coiled cord that plugs into monitor and 240 Vac power cord.

PC1K1-A*

*Replace the asterisk in the keyboard country kit order code with the letter that precedes the desired country/language listed below.

A—USA/Canada

D—Denmark

E—United Kingdom

F—Finland

G—Germany

H—Netherlands

I—Italy

K—French-speaking
SwitzerlandL—German-speaking
Switzerland

M—Sweden

N—Norway

P—France

Keyboard for PC100-B2/-P2 and system documentation. Includes 6-foot coiled cord that plugs into monitor and 240 Vac power cord.

PC1K1-B*

*Replace the asterisk in the keyboard country kit order code with the letter that precedes the desired country/language listed below.

B—Belgium

D—Denmark

E—United Kingdom

F—Finland

G—Germany

H—Netherlands

I—Italy

K—French-speaking
SwitzerlandL—German-speaking
Switzerland

M—Sweden

N—Norway

P—France

Video Monitors

Monochrome video monitor, white phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability.

VR201-A

Monochrome video monitor, green phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability.

VR201-B

Monochrome video monitor, amber phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability.

VR201-C

Color monitor. 33.02-centimeter (13-inch) screen, RGB color monitor. Includes power cord and documentation country kit.

VR241-A*

*Replace the asterisk in the color monitor order code with the letter that precedes the desired country/language listed below.

B—Belgium

D—Denmark

E—United Kingdom

F—Finland

G—Germany

H—Netherlands

I—Italy

K—French-speaking
SwitzerlandL—German-speaking
Switzerland

M—Sweden

N—Norway

P—France

Configuring the Base Rainbow System

To configure a base system, order on system unit, a keyboard country kit, and one video monitor.

Rainbow 100B and 100 + Hardware Options

Ordering Information

Option Order Codes	Option	Order Code
Memory		
	A 128-Kbyte base memory module. Provides an additional 128 Kbytes of parity RAM.	PC1XX-AC
	A 256-Kbyte base memory module. Provides an additional 256 Kbytes of parity RAM.	PC1XX-AD
	A 64-Kbyte, add-on memory chip set. Requires PC1XX-AC or PC1XX-AD.	PC1XX-AY
	A 256-Kbyte, add-on memory chip set. Requires PC1XX-AC or PC1XX-AD.	PC1XX-AZ
Storage		
	Dual-diskette drive option. Provides an additional 800 Kbytes of floppy storage on two 5¼-inch diskettes, for Rainbow 100B system total of 1.6 Mbytes of mass storage on floppies.	RX50-XA
	10-Mbyte hard-disk option. A 10-Mbyte Winchester, disk controller module, documentation, and a system test diskette for Rainbow 100B. Stores up to 5,000 double-spaced pages of text. Autoboot capability.	RCD51-BA
Graphics		
	Graphics option. Includes color signal cable (BCC17-06) and GSX-86 software, the graphics system extension to CP/M-86/80.	PC1XX-BA
	Rainbow personal presentation system. Combination of Rainbow – with 256-Kbyte memory, graphics option, and color monitor – and Palette™ computer image recording system from Polaroid Corporation and appropriate graphics software such as Graphwriter™ from Graphic Communications, Inc.). Lets Rainbow users create 35mm color slides and prints of graphic displays right at their desks, quickly and cost-effectively.	N/A
Palette ordering information: Polaroid Corporation Industrial Marketing 575 Technology Square Cambridge, MA 02139 1(800)225-1618		
Communications		
	Extended Communications Option. Module provides second communications port that supports DMA asynchronous/byte-synchronous and bit-synchronous communications and an RS422 port (an industry standard) that runs at speeds up to 880 Kbits per second. Extends the functions of the Rainbow 100B by providing access to external devices that can be manipulated under program control.	PC1XX-BB
Co-Processor for Floating Point		
	8087 Numeric Data Processor. Co-processor for 8088 CPU. Provides floating point and increased math processing. Includes memory adapter for PC100-A.	PC1XX-EA

Rainbow 190 Workstation System Specifications

System Unit

Rainbow 100 + System Unit. Has 640-Kbyte memory (includes 256-Kbyte memory chip set), Z80A and 8088 CPUs, 10-Mbyte internal hard disk, dual diskette drives, factory-installed technical character set ROMs containing four character sets (USA ASCII, UK, VT100 line drawing, and scientific), comm port, printer port, and power supply. Built in VT102 terminal emulation. Includes monochrome monitor cable BCC14-10 cable for printer or modem.

Keyboard

ALL-IN-ONE/word processing keyboard (like DECmate II).

Video Monitors

Monochrome Video Monitor, white phosphor, green phosphor, or amber phosphor. A 12-inch screen, 80 or 132 columns bit-mapped graphics capability.

Software

The Rainbow 190 workstation package also includes Rainbow Office Workstation V1.0 software, WPS-PLUS/Rainbow V1.0 word processing software, and MS-DOS V2.11 Operating System.

Rainbow 190 Order Codes

Option	Order Code
Systems	
Rainbow 190 with monochrome video monitor, white phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability. The USA/Canada English technical character set replaces all European technical character sets. The 190 system is recommended for use only in English language environments. Documentation is only available in USA/English.†	PC19P-AA
Rainbow 190 with monochrome video monitor, green phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability. The USA/Canada English technical character set replaces all European technical character sets. The 190 system is recommended for use only in English language environments. Documentation is only available in USA/English.†	PC19P-AJ
Rainbow 190 with monochrome video monitor, amber phosphor. A 12-inch screen, 80 or 132 columns, bit-mapped graphics capability. The USA/Canada English technical character set replaces all European technical character sets. The 190 system is recommended for use only in English language environments. Documentation is only available in USA/English.†	PC19P-AS
†European technical character sets are not available for the Rainbow 190, however, an equivalent 190 can be made from Rainbow 100 + components. Ask your Digital sales representative for full details.	
Option	Order Code
Keyboards (also see Rainbow 100 + keyboard descriptions)	
USA/Canada keyboard kit. Includes keyboard and power cord.	LK201-AA
USA/Canada gold key keyboard kit. For use with ALL-IN-1 systems and WPS-like word processing packages. Includes keyboard and power cord.	LK201-BA
USA/Canada VAXstation 100 keyboard kit. Includes keyboard and power cord.	LK201-CA

Option		Order Code
Color monitor. 33.02-centimeter (13-inch) screen, RGB color monitor. Includes power cord and documentation country kit.		VR241-A*
*Replace the asterisk in the color monitor order code with the letter that precedes the desired country/language listed below.		
B—Belgium	D—Denmark	E—United Kingdom
F—Finland	G—Germany	H—Netherlands
I—Italy	K—French-speaking Switzerland	L—German-speaking Switzerland
M—Sweden	N—Norway	P—France
S—Spain		

Option	Order Code
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Memory

Memory adapter module. Allows use of PC1XX-AC, -AD, -AY, and -AZ memory options in PC100-A.

PC1XX-AK

A 128-Kbyte base memory module. Requires PC1XX-AK memory adapter module or PC1XX-EA 8087 option in PC100-A.

PC1XX-AC

A 256-Kbyte base memory module. Requires PC1XX-AK memory adapter module or PC1XX-EA 8087 option in PC100-A.

PC1XX-AD

A 64-Kbyte add-on memory chip set. Requires PC1XX-AC or PC1XX-AD.

PC1XX-AY

A 256-Kbyte add-on memory chip set. Requires PC1XX-AC or PC1XX-AD.

PC1XX-AZ

Dual-diskette drive option.

RX50-XA

A 5-Mbyte hard-disk upgrade kit. 5-Mbyte Winchester, disk controller module, power supply, documentation, a system test diskette, and CP/M-86/80 and MS-DOS for a hard-disk-based system.

RCD50-BB

A 10-Mbyte hard-disk upgrade kit. 10-Mbyte Winchester, disk controller module, power supply, documentation, a system test diskette, and CP/M-86/80 and MS-DOS for a hard-disk-based system. Stores up to 5,000 double-spaced pages of text. Provides a 25-percent improvement in system performance over the 5 Mbyte hard-disk system: average access time is halved.

RCD51-BB

Graphics option. Palette of 1,024 colors on PC100-A. Includes color signal cable (BCC17-06) and GSX-86 software, the graphics system extension to CP/M-86/80.

PC1XX-BA

Extended communications option. For floppy-based system only.

PC1XX-BB

A 8087 numeric data processor. Includes memory adapter for PC100-A.

PC1XX-EA

External Devices and Accessories for Rainbow Systems

Ordering Information

External Device and Accessory Order Codes

Option	Order Code
Printers and Plotters	
LA50 personal printer. Dot-matrix.	LA50
Letterprinter 100. Dot-matrix.	LA100
Letter printer 210. Dot-matrix.	LA210
LQP02 Letter-Quality Printer. Daisywheel.	LQP02
LQP03 Letter-Quality Printer. Daisywheel.	LQP03
Color Graphics Pen Plotter. 6-pen graphics plotter.	LVP16
External Devices	
Serial Switch. Connects two printers to one Rainbow.	LQPX2-SW
Serial Interface Switch. Connects two communication lines to one Rainbow.	PCXXF-CZ
Mini Exchange. Microprocessor port selection device. Connects up to 8 standard RS 232/423 devices (personal computers, printers, modem). Allows up to 4 simultaneous connections. Use BCC04 or BCC14 cables.	DFMSA-AA
Cables	
Modem/Printer Cable—10-ft. A 16-pin RS232 peripheral cable. Connects LA50, LA100, LA210, LQP02, LPQ03, DF03, or DF112-AA to Rainbow.	BCC14-10
Modem/Printer Cable—25-ft. A 25-pin RS232 peripheral cable. Connects LA50, LA100, LA210, LQP02, LPQ03, DF03, or DF112-AA to Rainbow.	BCC04-25
Modem/Printer Cable—50-ft. A 25-pin RS232 peripheral cable. Connects LA50, LA100, LA210, LQP02, LPQ03, DF03, or DF112-AA to Rainbow.	BCC04-50
Pen Plotter Cable. Connects LVP16 or Hewlett-Packard pen plotter to Rainbow communication port.	BCC19-15
Accessories	
System Unit Floorstand. Mounts system unit vertically so it fits under table or desk.	PCXXF-BA

Rainbow 100*		Rainbow 100B	Rainbow 100 +
System Unit	PC100-A	PC100-B2 for USA/Canada	PC100-P2 for USA/Canada
Keyboard	PC1K1-AA for USA/English Canada PC1K1-AC for French Canada LK201-BA for USA/Canada Gold Key	PC1K1-EA for USA PC1K1-BQ for English Canada PC1K1-BC for French Canada PC1K1-FA for USA/Canada Gold Key	
Video Monitor		VR201-A B & W Monochrome VR201-B Green Monochrome VR201-C Amber Monochrome VR241-AA Color for USA VR241-AQ Color for English Canada VR241-AC Color for French Canada	

*The Rainbow 100 (PC100-A) has been replaced by the Rainbow 100B; it is listed here for comparison and upgrade purposes only.

Rainbow Expansion

Rainbow is designed to grow with the user's needs.

There are three expansion slots on the Rainbow system board.

- Slot 1 is dedicated for additional memory and the 8087 co-processor.
- Slot 2 is dedicated for the graphics module.
- Slot 3 is a general purpose expansion slot available for a Winchester controller (already filled in Rainbow 100 +) or the extended communications option or a third-party module. Only one option module at a time can reside in this slot. There is space inside the system box of the Rainbow 100 and Rainbow 100B for an additional drive, either a second dual-diskette (floppy) drive or a hard-disk (Winchester) drive.

A printer port and a communications port are included as external interfaces.

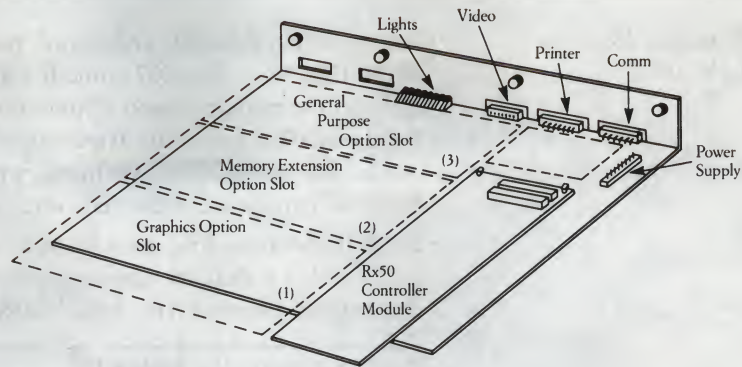
Configuring Options for Internal Expansion for the 100B and 100 +

Options	Order Code
Memory	Slot 1
128 KB Memory Module (+ Chip Set)	PC1XX-AC
256 KB Memory Module (+ Chip Set)	PC1XX-AD
8087 Numeric Data Control Processor	PC1XX-EA
Graphics Options Module	Slot 2
	PC1XX-BA
10 MB Hard Disk Controller (Already filled in 100 +)	Slot 3
Extended Communications Option or	ECD51-BA
Third Party Modules	AC1XX-BB
10 MB Hard Disk (for 100B only)	Available
Dual-Diskette Drive (for 100B only)	Storage Space
	RX50-XA
Technical Character Set	Tech ROM
	Replacement
	PC1XX-FB

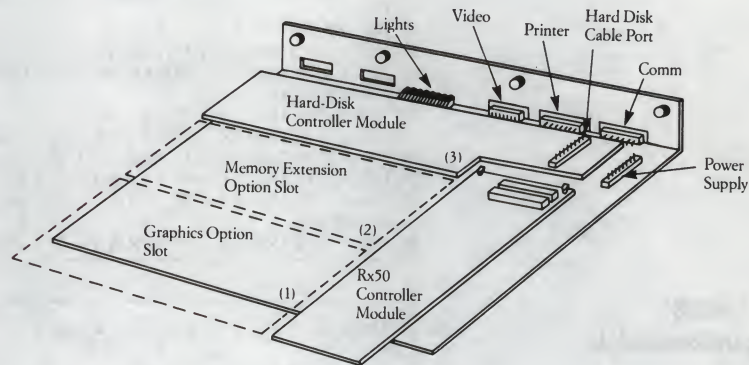
Configuring Options for External Interfaces for 100A, 100B and 100 +

Options	Order Code
LA50 Personal Printer	Printer Port (RS232)
LA210 Letterprinter	LQ50-RA
LQP02 Letter Quality Printer	LA210-AA
LQP03 Letter Quality Printer	LAP02-AA
Color Graphics Pen Plotter	LQP03-AA
Serial Switch	LQP16-AA
	LQPX2-SW
Asynchronous Modem	Comm Port (RS232)
Serial Interface Switch	DX112-AA
Mini Exchange	PCXXF-CZ
	DFMSA-AA

Rainbow 100B System Board



Rainbow 100+ System Board

Memory Configuration Notes for
Rainbow 100B and 100+

- Choose either the 128-Kbyte base memory (PC1XX-AC) module or the 256-Kbyte base module (PC1XX-AD). If you originally purchase the 128-Kbyte module and later find that you need more than 512 Kbytes, you can remove from one or both banks the chips that originally came on the board and replace them with 256-Kbyte chip sets. This protects your investment in the base module.
- Add chip sets (PC1XX-AY) and/or PC1XX-AZ as needed (see possible combinations below).
- The chips are MOS volatile RAMs and could be damaged when they are added to the base modules. Digital recommends that installation be done by Digital Field Service or an authorized Digital dealer. Customers desiring to install their own chips should carefully follow the instructions for installation.

Possible Combinations
for Rainbow 100B and 100+

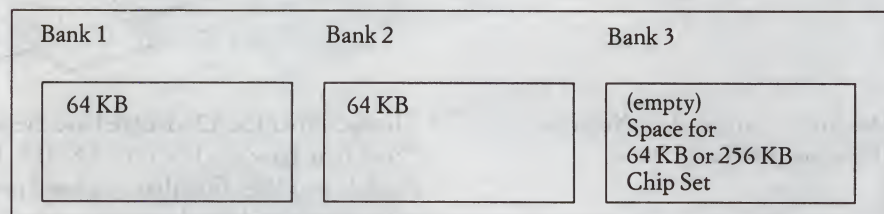
	Kbytes of Memory	Total
PC100-B/P	128 KB	128 KB
PC100-B/P + PC1XX-AC	128 KB + 128 KB	256 KB
PC100-B/P + PC1XX-AC + PC1XX-AY	128 KB + 128 KB + 64 KB	320 KB
PC100-B/P + PC1XX-AD	128 KB + 256 KB	384 KB
PC100-B/P + PC1XX-AD + PC1XX-AY	128 KB + 256 KB + 64 KB	448 KB
PC100-B/P + PC1XX-AC + PC1XX-AZ	128 KB + 128 KB + 256 KB	512 KB
PC100-B/P + PC1XX-AD + 2 × PC1XX-AY	128 KB + 256 KB + 128 KB	512 KB
PC100-B/P + PC1XX-AP + PC1XX-AZ	128 KB + 256 KB + 256 KB	640 KB
PC100-B/P + PC1XX-AD + PC1XX-AY + PC1XX-AZ	128 KB + 256 KB + 64 KB + 256 KB	704 KB
PC100-B/P + PC1XX-AD + 2 × PC1XX-AZ	128 KB + 256 KB + 512 KB	896 KB

Memory Configuration Notes for Rainbow 100 (PC100-A)

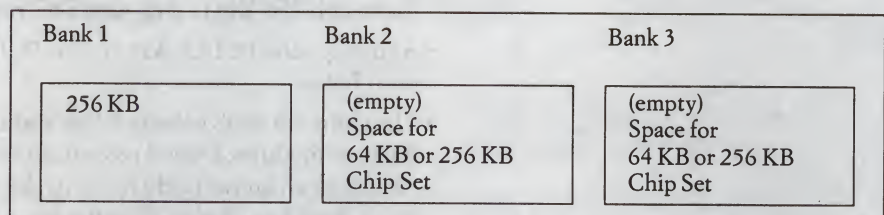
- For maximum flexibility and growth potential, order the memory adapter module PC1XX-AK or the 8087 numeric coprocessor PC1XX-EA which already includes the memory adapter. Now you can use the same memory options for the Rainbow 100 as for the 100B and 100+. Choose either the 128-Kbyte base memory module or the 256-Kbyte memory module. Then add chip sets in the empty banks to increase memory even more (see possible combinations below).
- For PC100-A memory expansion, you can use the 8087 coprocessor in place of the PC1XX-AK memory adapter module, because the PC1XX-EA option includes the memory adapter on the same board with the 8087 numeric data processor.

Possible Combinations for Rainbow 100	Kbytes of Memory	Total
PC100-A	64 KB	64 KB
PC100-A + PC1XX-AA	64 KB + 64 KB	128 KB
PC100-A + PC1XX-AK + PC1XX-AC	64 KB + 128 KB	192 KB
PC100-A + PC1XX-AK + PC1XX-AC + PC1XX-AY	64 KB + 128 KB + 64 KB	256 KB
PC100-A + PC1XX-AB	64 KB + 192 KB	256 KB
PC100-A + PC1XX-AK + PC1XX-AD	64 KB + 256 KB	320 KB
PC100-A + PC1XX-AK + PC1XX-AD + PC1XX-AY	64 KB + 256 KB + 64 KB	384 KB
PC100-A + PC1XX-AK + PC1XX-AC + PC1XX-AZ	64 KB + 128 KB + 256 KB	448 KB
PC100-A + PC1XX-AK + PC1XX-AD + 2 × PC1XX-AY	64 KB + 256 KB + 128 KB	448 KB
PC100-A + PC1XX-AK + PC1XX-AD + PC1XX-AY	64 KB + 256 KB + 64 KB	640 KB
+ PC1XX-AZ	+ 256 KB	
PC100-A + PC1XX-AK + PC1XX-AD + 2 × PC1XX-AZ	64 KB + 256 KB + 512 KB	832 KB

PC1XX-AC 128 KB Memory Expansion Module



PC1XX-AD 256 KB Memory Expansion Module



Storage/Disk Drives

There is room in the Rainbow 100B and Rainbow 100 system unit for one additional drive—either a second floppy drive (for a system total of 1.6 Mbytes on four diskettes) or a hard disk. You can only add a floppy disk if general slot 3 is not available for the controller module.

For Rainbow 100B:

Adding a 10-Mbyte hard-disk drive and controller (RCD51-BA) upgrades the 100B to a full-fledged 100+.

For Rainbow 100:

When adding a 5-Mbyte or 10-Mbyte hard-disk upgrade kit, you have to replace the power supply.

8087 Numeric Data Processor

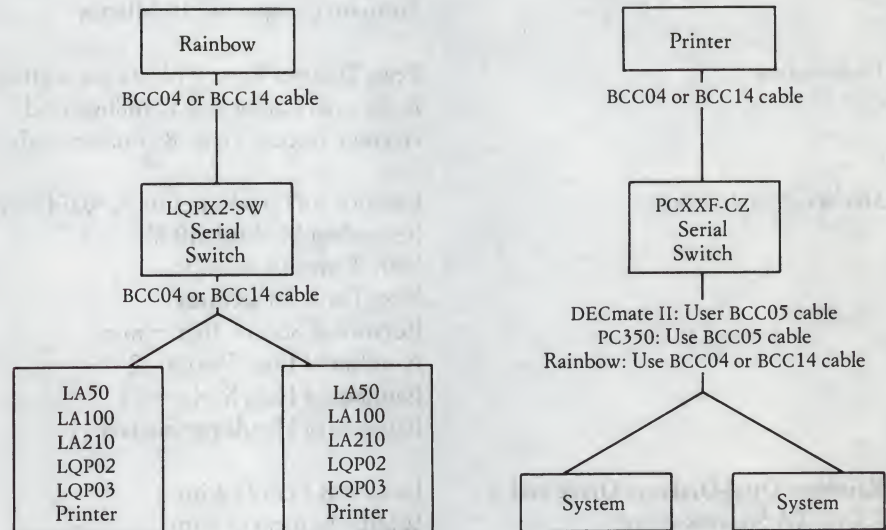
- The 8087 co-processor goes into the memory expansion slot, but there is still room for any of Digital's memory expansion modules as well. The 8087 board includes the memory adapter for the PC100-A system.

Character Set ROMs

- Installing the Technical Character Set (PC1XX-FA for PC100-A, PC1XX-FB for PC100-B2/P2) involves replacing the existing system ROMs. You therefore lose the multinational character set.
- For the PC100-A, foreign-language users cannot install the foreign-language ROM that came with their Country Kit if they wish to install the Technical Character Set.

Rainbow supports serial printers with XON/XOFF protocol. In selecting a printer, make sure that the software applications you want to use support that device. This is especially important for word processing and graphics packages.

- Hooking up an LA50, LA100, LA210, LQP02, or LQP03 printer to the Rainbow communication port requires a BCC14-10 or BCC04 cable. (The Rainbow system comes with one BCC14-10 cable.)
- To hook up an LVP16 or Hewlett-Packard pen plotter to a Rainbow communication port requires a BCC19-15 cable.
- With GSX-86 graphics software (and therefore GraphPlan-86 and other 16-bit CP/M graphics packages), the LVP16 plotter connects to the communication port. Although the LVP16 is a 6-pen plotter, Lotus 1-2-3 and GSX-86 (therefore also GraphPlan-86) currently support just 2 pens. Packages such as AutoCAD™ from AutoDESK, Inc., Graphwriter from Graphic Communications, Inc., and Symphony from Lotus Development Corp. will support all 6 pens.
- The LQPX2-SW serial switch lets you hook up two Digital printers to a Rainbow.
- The PCXXF-CZ serial switch lets two Digital microcomputers—two Rainbows or a Rainbow and a DECmate or a Rainbow and a Professional 350—share the same printer.



Communications Hardware

- The DF112-AA or DF03 modem plugs right into the Rainbow communications port. It requires a BCC14-10 or BCC04 cable. (Rainbow system comes with one BCC14-10 cable, which can be used either for printer or modem.)
If you need more than one communications line:
- Use the PCXXF-CZ serial switch, which plugs into the communication port.
OR
- Use the extended communication option (for floppy-based Rainbow only, takes up the general purpose expansion slot) to provide a second communication port.

Third-Party Hardware Options

Numbers of independent vendors offer hardware options for the Rainbow personal computers. These include a mouse, IEEE-488 interface bus, A/D and D/A converter, protocol converters (IBM 3270), a local area network, hard disks (greater than 10 Mbytes), and a text-to-speech processor. See the *Rainbow Handbook* for a list of producers and their addresses.

Consult the vendor for configuration requirements and to find out whether the third-party option you are interested in works on the Rainbow system you are purchasing.

Digital does not endorse nor test these products.

	PC100-B	PC100-P
Height	6.5 inches (16.5 cm)	6.5 inches (16.5 cm)
Length	19 inches (48.3 cm)	19 inches (48.3 cm)
Width	14.3 inches (36.3 cm)	14.3 inches (36.3 cm)
Max Weight	30 lbs (13.6 kg)	35 lbs (15.8 kg)
Power Supply Type	Transistor, switch-type AC to DC converter	Transistor, switch-type AC to DC converter
AC Input	Switch-selectable Single-phase, 3-wire 100-120V nominal (90-128V rms) or 200-240V nominal (180-256V rms) 47-53 Hz low line frequency 57-63 Hz high line frequency	Switch-selectable Single-phase, 3-wire 100-120V nominal (90-128V rms) or 200-240V nominal (180-256V rms) 47-53 Hz low line frequency 57-63 Hz high line frequency
Line Current	3A @ 115 Vac or 2A @ 230 Vac	3A @ 115 Vac or 2A @ 230 Vac
AC Power Consumption	218 Watts	237 Watts
Regulated Voltages	+ 5V, 12V, and -12V DC	+ 5V, 12V, and -12V DC
Circuit Protection	Circuit breaker, externally accessible	Circuit breaker, externally accessible

Rainbow 100 + Internal Hard-Disk Drive and RCD51 Specifications

Height: 8.3 cm (3.3 in)
Width: 14.6 cm (5.8 in)
Depth: 20.4 cm (8.5 in)
Weight: 2.3 kg (4.5 lb)
Formatted Capacity: 10 Mbytes

Performance

Peak Transfer Rate: 5 Mbits per second
Rotational Latency: 8.33 milliseconds
Average Access Time: 85 milliseconds

Media Characteristics

Density: 345 tracks per inch, 9,074 bits per inch
Recording Method: MFM
Start Time: 15 seconds
Stop Time: 20 seconds
Rotational Speed: 3600 r/min
Number of Data Platters: 2
Number of Data Surfaces: 4
Number of Heads per Surface: 1

Rainbow Dual-Diskette Drive and RX50-XA Specifications

Height: 8.3 cm (3.3 in)
Width: 14.6 cm (5.8 in)
Depth: 20.4 cm (8.5 in)
Weight: 1.7 kg (3.8 lb)
Diskettes per Drive: 2
Number of Recorded Surfaces: 2 (1 per diskette)

Capacity

Per Drive: 819 Kbytes
Per Track: 10 sectors
Per Sector: 512 bytes
Transfer Rate: 250 Kbits per second
Random Access Time: 264 milliseconds
Rotational Speed: 300 r/min
Densities: 96 tracks per inch

Rainbow Keyboard Specifications

Height: 1.25–4 cm (0.5–1.6 in)
Length: 53.3 cm (21 in)
Width: 17.1 cm (6.75 in)
Weight: 2 kg (4.5 lb)
Home Row Key Height: 3 cm (1.2 in) above desktop
Keys: 105 with matte-textured finish and concave surface
1.27 cm (.50 in) square
1.9 cm (.75 in) center-to-center spacing between keys for single-width keys
Wobble less than .5 mm (.020 in)
Keypad: Sculptured key array in four groups
N-key rollover
Numeric Data Entry Keys: 18 on far right
Function Keys: 20 positioned across top
Typing Keys: 57 Screen/Cursor Control Keys: 10 in the middle keypad
Cord to Video Monitor: 6 Ft (1.9 m), coiled;
4-pin telephone-type modular connectors
Electronics:
8-bit microprocessor
4 Kbytes of ROM
56 bytes of RAM
4 light-emitting diodes
Speaker for audio feedback
Diagnostics: Power-up self-test, generates identification code upon passing test
International Standards Conformance:
Meets European 30-mm home row requirement and provides clearance for
diskette-drive media insertion, without having to move keyboard away from
system.

Rainbow Monochrome Video Monitor Specifications

Height: 29.2 cm (11.5 in)
Width: 34.9 cm (13.75 in)
Depth: 31.1 cm (12.25 in)
Weight: 6.4 kg (14 lb)
Adjustable Tilt: +5 to –25 degrees
Standard Video Output: RS170-compatible, monochrome character cell video
Video Screen: 12 inches (diagonal). Antiglare filtering to reduce eye fatigue
Video Display: High-resolution monochrome with bold, underline, blink, and
reverse-video
Split-screen capability
60-image-per-second refresh rate reduces screen flicker
Characters: 7 × 9 dot matrix, includes 2-dot descenders
Format: 80 or 132 columns wide, selectable, by 24 lines, for a total in excess of
3,000 characters
Graphics: (With Graphics Option) 800 × 240 pixels
Set-up Parameters: Smooth or jump scroll, scroll rate, light or dark screen, block
or underline cursor, autowrap, automatic screen blank, menu-selectable

Rainbow Color Monitor Specifications

Height: 31.9 cm (12.8 in)
Width: 36.3 cm (14.5 in)
Depth: 43.2 cm (17.0 in)
Weight: 16.6 kg (36.6 lb)
Video Screen: 13 inches (diagonal)
High-resolution color
High-efficiency, antiglare filter

Color Graphics (With Graphics Option):

High-resolution Mode: 800 × 240 pixels, 4 selectable colors
Medium-resolution Mode: 384 × 240 pixels, 16 selectable colors
Palette 1,024 colors for the Rainbow 100*

*The palette for the Rainbow 100 is 4,096 colors, if separate monitors are used for text and graphics.

4,096 colors for the Rainbow 100B and 100 +
 Text (under video control of system unit)
 Format: 80 or 132 columns wide, selectable, by 24 lines
 7 × 9 dot matrix, includes 2-dot descenders
 Video Display: Bold, underline, blink, and reverse-video, and split-screen capability
 Active Raster Size: 240 mm (W) × 150 mm (H)
 Dot Pitch: .31 mm resolution (shadowmask)
 Degaussing: Built-in, automatic
 Interface: Standard RS170 RGB (red-green-blue) cable connector with built-in line termination
 Power Supply : Universal, switch-selectable
 90-120 Vac, 47-63 Hz or 185-256 Vac, 47-63 Hz
 Hardware Prerequisite: Graphics Option (PC1XX-BA)

Rainbow Graphics Option Module Specifications

Graphics Type: Bit-mapped

Resolution:

High-resolution Mode: 800 × 240 pixels, 2 planes

Medium-resolution Mode: 384 × 240 pixels, 4 planes

Number of Colors Displayed:

High-resolution Mode: 4 colors, selectable

Medium-resolution Mode: 16 colors, selectable

Palette: 1,024 for the Rainbow 100*

*The palette for the Rainbow 100, 100B, and 100 + is 4,096 colors, if separate monitors are used for text and graphics.

4,096 for the Rainbow 100B and 100 +

Scrolling Capabilities: Horizontal and vertical

Split Screen Scrolling: Regions vertically Table Number Table-Title:

Rainbow 100B and 100 + Foreign Language System Components

Rainbow 100B and 100 + Foreign Language System Components

Country	System Unit	Keyboard Country Kit	Color Monitor
UK	PC100-B3 (240V)	PC1K1-BE	VR241-AE
Germany	PC100-P3 (240V)	PC1K1-BG	VR241-AG
Switzerland		PK1K1-BK	VR241-AK
Switzerland		PC1K1-BL	VR241-AL
(French)		PC1K1-BP	VR241-AP
Switzerland		PC1K1-BZ	VR241-AZ
(German)			
France			
Australia			
Netherlands	PC100-B4 (240V)	PC1K1-BH	VR241-AH
Belgium	PC100-P4 (240V)	PC1K1-BB	VR241-AB
Sweden	PC100-B5 (240V)	PC1K1-BM	VR241-AM
Finland	PC100-P5 (240V)	PC1K1-BF	VR241-AF
Denmark	PC100-B6 (240V)	PC1K1-BD	VR241-AD
Norway	PC100-P6 (240V)	PC1K1-BN	VR241-AN
Spain	PC100-B7 (240V)	PC1K1-BS	VR241-AS
Italy	PC100-P7 (240V)	PC1K1-BI	VR241-AI

Over 1,500 software packages are available for use with the Rainbow personal computer. Digital offers about 100 of these, often better tailored for Rainbow, under its Digital Classified Software program. All of the software currently available from Digital is listed here. Also listed are selected referral (third-party) packages and operating systems. Digital neither tests nor endorses this third-party software; it is included for your information only.

The software is listed by category in the following order:

- Operating Systems
- Office Workstations
- Integrated Applications
- Spreadsheets
- Word Processors
- Mailing-List Managers
- Database and Information Management
- Equation Solving
- Financial Management
- Accounting
- Vertical-Market Packages
- Project Management
- Utilities
- Graphics
- Languages
- Communications
- Entertainment

Operating Systems

*MSTM-DOS V2.11 &
CP/M(r)-86/80 V2.0*

MS-DOS V2.11 and CP/M-86/80 V2.0 (QA066-A3). Digital offers both operating systems combined in one package.

Order Number QA66-A3

Rainbow's MS-DOS V2.11, an enhanced version of the Microsoft operating system, includes a "REDCPM" utility that reads CP/M diskettes so that users can transfer data stored in CP/M format to MS-DOS format. Users can purchase either a complete MS-DOS V2.11 end-user kit or an MS-DOS V2.05 update kit. New features include built-in device sharing commands that support Digital's Mini-Exchange hardware, International System calls that allow users to incorporate the appropriate commercial metrics into their applications for a variety of countries. MS-DOS V2.11 also provides improved sort and disk storage utilities and improved technical and MDRIVE documentation.

Order Number QV062-A3 (Complete system)

Order Number QVO62-H3 (V2.05 Upgrade kit)

CP/M-86/80, a combination of Digital Research, Inc.'s 16-bit CP/M-86 and 8-bit CP/M-80 with additional utilities, includes the Learn Rainbow on-screen tutorial for computer novices. CP/M-86/80 switches automatically between 8-bit and 16-bit programs.

Order Number QV061-A3

Both MS-DOS and CP/M-86/80 include MDRIVE, a RAM disk which will greatly increase system performance speed. In memory drive, a virtual disk drive, operating system uses allocated memory as though it were a floppy diskette drive. MDRIVE requires minimum of 192 Kbytes of memory.

Concurrent CP/M-86™

This multitasking operating system runs up to four 16-bit CP/M applications simultaneously. For example, with CCP/M-86 and applicable applications, users can print a document, check the spelling of another document, and sort a database while working interactively with a spreadsheet program.

Minimum hardware requirements: 256 Kbytes of memory (512 Kbytes are recommended); 10-Mbyte hard disk strongly recommended.

Ordering Information:

Digital Research, Inc.
60 Garden Court
Box DRI
Monterey, CA 93942
(408)649-3896

UCSD p-System™

With the UCSD p-System, programmers can develop applications on Rainbow, then compile to object code (p-code), which is totally transportable. So applications written on Rainbow under the UCSD p-System can then run on other microcomputers without recompilation.

Minimum Hardware Requirements: 64 Kbytes memory

Ordering Information:

SofTech Microsystems, Inc.
16875 Bernardo Drive
San Diego, CA 92127
(619)451-1230

VENIX/86™

This multitasking UNIX™ operating system, based on Version 7 UNIX with Berkeley extensions, is a licensed implementation of AT&T's UNIX from VenturCom, Inc. With VENIX, a Rainbow user can run both a foreground task and multiple background tasks at the same time.

Minimum hardware requirements: 256 Kbytes memory and a 10-Mbyte hard disk.

Ordering Information:

Unisource Software Corporation
71 Bent Street
Cambridge, MA 02141
(617)491-1264

Co-Idris™

This UNIX™ look-alike is a multitasking operating system. Co-Idris can co-exist with MS-DOS on Rainbow's hard disk, so users can run applications from both operating systems.

Minimum hardware requirements: 128 Kbytes memory and a 10-Mbyte hard disk.

Ordering Information:

Whitesmiths, Ltd.
97 Lowell Road
Concord, MA 01742
(617)369-8499

Rainbow Office Workstation

The Rainbow Office Workstation is a software product that provides a simple menu interface to access both VAX and Rainbow applications and resources. With the Rainbow Office Workstation software, the hard-disk-based Rainbow performs easy data exchange between Rainbow and host, of files, VAX datatrieve extracts, electronic mail, hard disk backups, and terminal sessions. It also provides a simple, high-speed user interface to the Rainbow's local applications and utility functions.

These features and others—scripted communications with automatic logon, and unattended mailruns and backups to the VAX—all work to link the personal computer applications of the Rainbow to the applications, data, and resources of the VAX, freeing the user from routine computing chores. Rainbow Office Workstation menus are compatible with those provided by the ALL-IN-1 Office Information System for maximum transparency and consistency within an ALL-IN-1 environment. However, ALL-IN-1 is not prerequisite software on the host VAX.

The Rainbow Office Workstation must be purchased in two pieces—a Rainbow end and a VAX end.

Minimum hardware requirements for Rainbow: 5-Mbyte or 10-Mbyte hard disk. Minimum of 256 Kbytes of system memory.

Minimum software requirements: For Rainbow—MS-DOS V2.11 For VAX—poly-XFR software for VAX/VMS host (QA142-C*) VAX Operating System, V3.7, or 4.0. VMS V4.0 is required for support of connections via Ethernet terminal servers on any type.

Rainbow Office Workstation V1.0 DOS RX

Order Number QVA28-A3

VAX-11**Rainbow Office Workstation Kits**

License required for each CPU

	VAX11/730	VAX11/750	VAX11/780
Single Use License	QC935-UZ	QD935-UZ	QE935-UZ
Distribution and Documentation	QC935-HG QC935-HM	QD935-HG QC935-HM	QE935-HY QC935-HM

Recommended software: For Rainbow—Rainbow MS-DOS spreadsheet, word processing, data base management, and other software; Rainbow ReGIS.

For VAX—VAX/VMS ALL-IN-1; VAX DATATRIEVE; DECmail

Order Number QVA28-A3 Rainbow Office Workstation V 1.0 DOS RX50

Order Number Q*935-UZ VAX Rainbow Office Workstation License

Lotus 1-2-3™

Spreadsheet integrated with graphics and information management. Menus and extensive online help make it easy to learn and use. Creates exceptionally large spreadsheets (subject to available memory) and graphs them instantly for presentations or what-if analyses. Programming capability to automate repetitive sets of keystrokes. Output either as text or in a number of different graphic formats, such as bar, pie, line, or stacked bar graphs, for high quality presentations; supports 6 colors. Information management facility lets users reorder the rows of entries, select the records they want, or perform statistical analyses on selected pieces of information.

Supports LA50, LA100, and LA210, LVP16 (2 pens); also includes driver for Hewlett-Packard HP7470A (not supported by Digital). Requires 256 Kbytes of memory (uses all available RAM); Graphics Option needed for text and graphics; Color Monitor for color graphics; MS-DOS V2.05 or later.

Order Number QA528-C3

Symphony™

Powerful program with integrated spreadsheet, graphics, information management, word processing, and communications functions, linked by windows. Expands capabilities of Lotus 1-2-3, including exploded pie charts and log and exponential scaling on the y-axis, 132-column display, and fully programmable command language. Online help and menu-driven commands. Supports LA50, LA100, LA210, LQP02, LQP03, and LVP16 (6 pens), plus Epson and Okidata printers (not supported by Digital). LVP16 must be connected to printer port. Requires minimum 320 Kbytes of memory (512 Kbytes or more are recommended). Graphics Option to display graphics; Color Monitor for color graphics; MS-DOS V2.11.

Order Number QAA69-C3

Spreadsheets

MicroPlan™-86

Powerful and versatile spreadsheet and financial modeling tool for finance professionals. Includes Tables Module for combining spreadsheets. Valuable as departmental or company tool for organization-wide data consolidation. Commands for automatic (users don't have to type in formulas) complex depreciation, loan analysis, internal rates of return, tax computations, and variance analyses. Advanced programming facility for creating complex applications to be used by whole organization, even novice users. Sophisticated data formatting and report generation. Requires CP/M-86/80 (16-bit).

Order Number QA282-C3

Equation Solving

TK!Solver™-86

Makes solving equations a snap. Lets users model problems requiring real number solutions to sets of algebraic equations. Requires CP/M-86/80 (16-bit).

Order Number QA283-C3

Introduction to TK!SolverPack CBI Course Package

This course offered by Digital's Educational Services, will teach you: basic sheets available, entering data onto the various sheets, storing and retrieving modules, maneuvering between various sheets, and basic TK!Solver commands and advanced commands. Includes tutorial diskette and student guide. Typical study time required: 1-2 hours.

Order Number EY-1994E-CS

**Financial Management
TK!SolverPack™**

Provides predefined models for financial analysis. The models include: Compound Interest Calculations, Level Debt Service Analysis, Net Present Value/Internal Rate of Return, Bond Swap Analysis, Anticipated Spread Swap, Bond Refunding Decision, Convertible Debt Analysis, Financial Statement Ratio Analysis, Analysis of Operating and Financial Leverage, Cost of Equity Capital, Capital Asset Pricing Model, Cost of Equity Capital, Dividend Growth Model, Black-Scholes Option Pricing, and Option Investment Performance. Requires TK!Solver-86 and CP/M-86/80 (16-bit).

Order Number QA469-C3

**Mechanical Engineering
TK!SolverPack™**

A series of predefined models designed to solve selected common problems in the field of mechanical engineering. The models include: Elastic Bending, Tow-pong Supported Beam, Elastic Bending, Cantilever Beam, Elastic Torsion Beam, Cylindrical Wall Heat Transfer, Planar Wall Heat Transfer, Thermal Effectiveness of Fins, Fluid Flow in Pipes, Hydraulic System Analysis/Design, Hydrostatic-Hatch Design, Area Moment of Inertia, Mohr's Circle, Helical Spring, and Natural Frequency of Vibration. Requires TK!Solver-86 and CP/M-86/80 (16 bit).

Order Number QA468-C3

Word and Text Processing

SELECT™

Easy-to-learn, high-quality word processor, spelling checker, mail merge, and on-screen tutorial program for inexperienced or occasional users. Ideal for many business people and managers, especially when used for memos and other shorter documents. Menu-driven. Fast execution. Has 132-column screen capability. Requires CP/M-86/80 (16-bit) or MS-DOS.

Order Number QA061-C3

WordStar®

Word processor for frequent and sophisticated users. Uses control codes for formatting; delivers substantial functionality. Can move columns of text horizontally. Popular with secretaries because of its history with a variety of microcomputers. Compatible with SpellStar, MailMerge, and StarIndex. Supports LA50, LA100, and LQP02 printers and hard disk.

Order Number QA460-C3, V3.33 for CP/M-86/80 (16-bit).

Order Number QA660-C3, V3.30 for MS-DOS.

SAMNA WORD™ II

Sophisticated word processor in dedicated WP tradition for secretaries. Includes Tutorial diskette. Uses function keys and mnemonics rather than menus or command codes. What you see is what you get with on-screen centering, justification, underlining, and bolding. Advanced search-and-replace capabilities and automatic footnoting. Split screen. Up to 250 columns (characters), although it can view only up to 132 at a time. With 16.5 characters per inch, print up to 132 columns on LA50; up to 250 on LA100 using wide paper or on LQP02 using appropriate compressed-font printwheel. Online help (three levels). Requires 256 Kbytes of memory.

Order Number QA740-C3 for MS-DOS

Order Number QA589-C3 for 16-bit CP/M-86/80

Mailing List Management Systems (List Processing)

*List Manager*TM

Stand-alone electronic filing system that helps keep mailing up-to-date or retrieves lists of information. Can index information in three ways. Can be used with SELECT-86. Requires CP/M-86/80 (16-bit).

Order Number QA277-C3

MailMerge[®]

Merges data from various files and inserts the information into a WordStar file for printing. Prints form letters from a mailing list, prints a file within another file, automatically prints a series of files, and prints multiple copies of the same file. Requires CP/M-86/80 (16-bit).

Order Number QA461-C3

Database and Information Management

PFS:®FILE

Easy-to-use file manager for storing information for a wide range of applications such as appointment calendars, customer listings, and student data. Stores about 2,500 simple forms (name, address, state, Zip, for example) on one Rainbow floppy disk. Items per screen: 100; screens per form: 32; items per form design: 3,200; characters per item: 1,679; sorting: by any item. Requires MS-DOS.

Order Number QA575-C3

PFS:®REPORT

Produces reports in the form of tables from information stored in files created with PFS:FILE. Sorts through PFS files and performs such arithmetic functions as averages, totals, and percentages. Requires PFS:FILE and MS-DOS.

Order Number QA577-C3

Delta

Translation-oriented database management system; format is menu-driven, making it relatively easy for novice users, but functional for complex data management applications as well. A Delta file is a transactional file allowing header and as many as eight transaction types per header, a file definition allows 90 fields split over the header and eight transaction files. The total length of the defined fields may be as many as 2,000 characters, with no real limit on the total size of a record (5,000–6,000 character norm).

Order Number QUER3-C3 CP/M-86/80 or QA588-C3 MS-DOS

*dBASE II*TM

Complete, sophisticated relational database management system. Rich command language makes it a programmer's tool, yet conversational commands allow novices to easily manipulate data. With its common English commands, users can create databases, append or sort records, and edit data contained within records. Commands can be entered from the console or grouped in a file for batch execution. Up to 65,535 records per file; up to 1,000 characters per record; up to 254 characters per field; and an index length of up to 100 characters. Provides special utilities such as SED for improved screen and dGEN for enhanced program and menu generation and dSORT for quick file sorting.

Order Number QA281-C3 dBASE II-86 (CP/M-86/8016-bit)

Order Number QA714-C3 dBASE II (MS-DOS V2.05 or later)

Order Number QA281-H3 (CP/M Upgrade Kit)

Languages

CBASIC[®]-86

Digital Research, Inc., implementation of BASIC, for developing commercial business applications.

Order Number

MBASIC[®]-86

Generic Microsoft BASIC language interpreter.

Order Number QA066-C3

MSTM-Basic Interpreter

MS-DOS version of MBASIC-86. Can be used to execute programs written in Microsoft BASIC (that are not dependent on extended communications or graphics, such as GW BASIC applications), for migrating from CP/M-86/80 to MS-DOS machines. Requires MS-DOS V2.05 or later.

Order Number QA857-C3

MSTM-BASIC Compiler

Microsoft BASIC optimizing compiler, complimentary to MS-BASIC interpreter. In most cases, compiled programs execute faster and require less memory than the same interpreted programs. Provides source code security. Requires MS-DOS V2.05 or later.

Order Number QA857-C3

GWTM-BASIC

Microsoft BASIC interpreter designed for 16-bit personal computers, tailored by Digital to take advantage of Rainbow video, graphics, and keyboard. Easy enough for beginners, yet powerful enough for business applications. Sophisticated screen handling, color graphics, buffered communications, and event trapping (key, timer, communication port, and error). Includes excellent character-oriented screen editor.

Some syntax differences between GW-BASIC and MBASIC-86/MS-BASIC interpreter. Requires 128 Kbytes of memory (256 Kbytes are highly recommended); graphics option for graphics, color monitor for color graphics; and MS-DOS V2.05 or later.

Order Number QV080-A3

MWC-86TM

Mark Williams C language compiler. Consists of several large phases that compile, link, optimize, and load C source programs for execution. Includes Mark Williams assembler. Requires CP/M-86/80 (16-bit).

Order Number QA068-C3

MSTM-FORTRAN Compiler

Microsoft version of FORTRAN-77 that meets 1977 ANSI standard requirement as the subset level and includes some features of the full standard, such as double-precision calculations to 14 significant digits. Supports 8087 floating-point coprocessor for faster computation of mathematical expressions. Modules written in macro assembly language, MS-FORTRAN, and MS-Pascal can be linked together into one program. Requires 192 Kbytes of memory and MS-DOS V2.

Order Number QAA14-C3

Pascal/MT+86TM

A Digital Research, Inc. superset of International Standards Organization (ISO) Pascal programming language, extended for more speed and versatility. Requires CP/M-86/80 (16-bit).

Order Number QA475-C3

MSTM-Pascal Compiler

Microsoft's highly structured compiler for systems software developers. Generates native machine code that generates substantially faster than programs compiled to UCSD p-code. Supports 8087 coprocessor. Modules written in macro assembly language, MS-FORTRAN, and MS-Pascal can be linked together into one program. Requires 192 Kbytes of memory and MS-DOS V2.

Order Number QA867-C3

AUTOSORT-86™

High-speed assembly language sort/merge/select routine designed for use with MBASIC-86. Requires CP/M-86/80 (16-bit).

Order Number QA300-C3

FABS-86™

Assembly language subroutine that maintains key files for fast data retrieval in large data files. Requires basic knowledge of a higher-level programming language. Requires CP/M-86/80 (16 bit).

Order Number QA299-C3

Chart-Master™

Produces business graphics with pie, bar, line, scatter area, and high/low/close charts for slides and prints. Seven different fonts and 16 type sizes are available for titles. Works with the Rainbow personal presentation system. Includes complete menu interface for creating graphics images and making the exposures with the Polaroid Palette. Uses as many as 10 menu-selectable colors from the Palette choice of 72 for any one graphic display. Most exposures require from 1.5 to three minutes. The resolution of all finished slides and prints is 800 × 480 pixels. Requires: 256-Kbyte memory, graphics option, color monitor, MS-DOS.

Ordering Information

Decision Resources, Inc.
21 Bride Square
Westport, CT 06880
USA 203-222-1974

GrafTalk™

Produces business graphics with stacked, percentage, clustered, or floating bars and exploded pie charts, scatter diagrams, and line and combination plots. Includes built-in text editor and minispreadsheet capability for performing arithmetic operations on data sets and adjusting data values interactively. Uses English-language commands interactively, runs commands from disk files, or uses customized or standard menus. Supports LA50, LA100, and LVP16 (6 pens); also includes device drivers for Hewlett-Packard HP7470 and HP7475 plotters (not supported by Digital). Requires Graphics Option, Color Monitor for color graphics, and CP/M-86/80 (8-bit).

Order Number QA607-C3

Graphwriter™

Produces a wide variety of charts for business graphics. The Basic Set includes formats for pie, bar, line, scatter plot, and word/text charts. The Extension Set has Gnat, organization, bubble, range, and table formats. Complete menus, format selection guides, help messages, and function keys make it easy to learn and use. Works with Rainbow's Personal Presentation System. A menu for the Polaroid Palette simplifies the process of turning screen images into slides and prints.

Takes full advantage of Palette's range of colors: select color charts of 12 colors each. Individual colors within the charts can be easily changed. For the background, users can select a 13th color from the entire 72-color palette.

Also includes a batch processing option that allows users to queue a list of graphic images, together with the number of copies desired of each, to the Palette hardware for automatic exposure processing. Exposure times range from just over two minutes, up to five minutes maximum. The resolution of color slides and prints can be as high as 800×480 pixels. Requires 256 Kbytes of memory, Graphics Option, and Color Monitor. Digital Distributed Software. User support provided by Graphics Communication, Inc.

Ordering Number QAX07-C3

GSX™-86

Graphics system extension for CP/M-86/80. Used by 16-bit CP/M-86/80 graphics applications like GraphPlan-86. Supports LA50 and LA100; also includes device drivers for Hewlett-Packard HP7470A and HP7220C and Houston Instruments DMP-29 and DMP-40 (not supported by Digital). Includes RGI (Rainbow Graphics Interpreter) and binding to MWC-86 (provided for user convenience, not supported by Digital). CB-86 can use GSX-86 for BASIC programming. Included with Graphics Option PC1XX-BA. Requires CP/M-86/80 (16-bit).

Lotus 1-2-3™

See previous description under **Integrated Applications**.

Order Number QA528-C3

SIGN-MASTER™

Produces textual graphics using as many as seven different fonts, special symbols and 16 text sizes from 10 pitch to as large as three inches tall. Allows selective use of italics, intermixed font types, underlining, text placement, and spacing. Works with the Rainbow personal presentation system to produce typeset quality images for slides and prints. Includes complete menu interface for creating graphics images and making the exposures with the Polaroid Palette. Uses up to 10 menu-selectable colors from the Palette choice of 72 for any one graphic display. Most exposures require from 1.5 to three minutes. The resolution of all finished slides and prints is 800×480 pixels. Requires: 256-Kbyte memory, Graphics option, colormonitor, MS-DOS.

Ordering Information

Decision Resources, Inc.
21 Bridge Square
Westport, CT 06880
USA 203-222-1974

Rainbow ReGIS™

Same Remote Graphics Instruction Set as VT240/VT241 with slight differences, a graphics depictor protocol for effective communications between a bit-mapped terminal and a host computer. For business, scientific, educational, and art graphics; animation possible. Use any language that can incorporate ASCII text, e.g., MBASIC-86 and MWC-86, to write programs including ReGIS commands for graphics output. Use poly-TRM (poly-COM) to access VAX utilities like DECslide and DECgraph. Rainbow ReGIS uses 4 colors selectable from 4,096. Users can download GIGI BASIC program from VAX to Rainbow; requires minor syntax modification to convert to MBASIC-86. Supports LA50 and LA100 printers. Runs under CP/M-86/80 or MS-DOS V2.01 or later. Requires Graphic Option; Color Monitor for color graphics.

Order Number QA743-C3

poly-COM™

Terminal emulation and flexible file transfer between Rainbow and a variety of hosts and operating systems, including VAX/VMS and PDP-11 RSX-11M, RSX-11M-PLUS, RSTS/E, and RT-11. Includes poly-TRM terminal emulator designed for interactive communications and transmission (uploading and downloading) of ASCII text files; poly-XFR and HST for error-free transmission and format conversion of files between Rainbow and a variety of other computers and operating systems; and SWITCH to operate Rainbow from a remote location. Requires appropriate poly-XFR (HST program) for host system for error-free file transfer; direct (hardware) connection or asynchronous modem.

Order Number QA193-C3 for MS-DOS and CP/M-86/80.

Note:

poly-XFR for VT180 host: QA138-C3

poly-XFR for DECmate II host: QA202-C3

poly-XFR for PDP-11 RSTS/E host: QA141-CD

poly-XFR for PDP-11 RSX-11M/M-PLUS host: QA139-CD, -CH, -CQ

poly-XFR for RT-11 host: QA140-CD, -CH, -CY

poly-XFR for VAX/VMS host: QA142-CG, -CM, -CY

poly-COM Update Kit

Replacement kit (for nominal fee) for users who previously purchased poly-XFR CP/M Communications and now need MS-DOS support. Major enhancements include 8-bit data paths throughout for supporting multinational character set; QUIT command for exiting from TRM program with DTR low for correct support of European modems; and MS-DOS operating-system support. To order, call 800-554-3333.

Order Number QA193-H3

*Introduction to poly-COM
CBI Course Package*

This course offered by Digital's Educational Services will teach you about modems and direct cable connections; the meaning of host, emulation, local system, remote system, text, and binary files; how to sign onto a host; how to receive and send text files; and how to transfer files between a Rainbow and a host or between Rainbows. Includes tutorial diskette and student guide. Typical study time required: 1-3 hours.

Order Number EY-1820E-CS

poly-BSC/RJE™

IBM remote job entry station (2780 and 3780) emulator. Operates in full- or half-duplex mode over point-to-point communication lines. Maximum line speed is 9,600 bits per second on dedicated lines. Use the poly-BSC/RJE product to submit batch jobs to an IBM host RJE system, to retrieve output from the host system after the job is completed, and to transmit and receive files from an IBM host system or another Rainbow running poly-BSC/RJE.

Order Number QA208-C3 for MS-DOS and CP/M-86/80.

poly-BSC/3270™

Accesses an IBM host using Binary Synchronous Communication (BSC) protocol by emulating one of IBM's 3270 family of display stations or printers. For interactive data communications; can be used for such tasks as data entry to the IBM host system, online database inquiry and updates, and program development.

Order Number QA206-C3 for MS-DOS and CPM-86/80.

Deadline™

Interactive murder mystery game/puzzle. Player assumes the role of the world's most renowned detective to solve one of the most baffling cases in the annals of criminology. Requires CP/M-86/80 (16-bit).

Order Number QA544-C3

Planetfall™

Humorous science-fiction adventure set in the distant future. You must survive after being jettisoned from a spaceship onto an alien planet. Your only companion is a robot with the mentality of an encyclopedia and minimal maturity. Requires CP/M-86/80 (8-bit).

Order Number QA548-C3

Starcross™

Science-fiction game that launches player into the year 2186 and the depths of space to rendezvous with a gargantuan ship from the outer reaches of the galaxy. Requires CP/M-86/80 (16-bit).

Order Number QA547-C3

Suspended™

Manipulating six engaging robots to solve an assortment of realistic problems, the player can bring the twilight world of Contra, a deep-space planet in crisis, back under control. Requires CP/M-86/80 (16-bit).

Order Number QA546-C3

Tycoon™

Compresses the excitement of 52 weeks of commodity trading into a few hours of fun. You begin with a hypothetical \$10,000. In simulated weeks, you make purchase decisions based upon a steady stream of business and news information. As your profits increase, you progress through a series of levels which involve increasingly sophisticated trading. Requires CP/M-86/80 (8-bit).

Order Number QA581-C3

Witness™

Hard-boiled "whodunit" thriller that masterfully reconstructs the great detective era of the Thirties. As Chief Police Detective for a quiet burg on the outskirts of Los Angeles, you're up against your toughest case yet. Requires CP/M-86/80 (16-bit).

Order Number QA545-C3

Zork™ I

Adventure. As an explorer in the world of Zork, you wander through a vast underground complex discovering riches and combatting danger. Dwarves, monsters, and thieves are here to hinder your great quest. Requires CP/M-86/80 (16-bit).

Order Number QA541-C3

Zork™ II

Player encounters volcanos, dragons, princesses, and the Wizard of Frabozz in the underground kingdom of Zork. You must use the skills of a master adventurer to solve the intricate riddles placed in your path. Requires CP/M-86/80 (16-bit).

Order Number QA542-C3

Zork™ III

Takes player on a journey from the ancient, high-arched aqueduct system to the Land of Shadow where the puzzles presented test a player's problem-solving ability. Players' greatest challenge is to discover their goals which are unknown at the start of the game. Requires CP/M-86/80 (16-bit).

Order Number QA543-C3

Zork™ Trilogy

Zork I, Zork II, and Zork III. Requires CP/M-86/80 (16-bit).

Order Number QA549-C3

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 Concurrent CP/M-86, CP/M, CP/M-86, and CP/M-80 are registered trademarks of Digital Research, Inc.
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 VENIX is a trademark of VenturCom, Inc.
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 1-2-3 and Symphony are trademarks of Lotus Development Corporation.



Product Description

The DECmate III word processor is the newest member of Digital's family of office automation products. It is a world-class, international, low cost, high-performance word processor for use in text-intensive environments. DECmate III provides excellent price/performance: it combines the best features of Digital's refined WPS operating system with advanced gate array technology to reduce system size and ensure reliability.

The DECmate III consists of four main components—a system unit, monitor, country kit (keyboard) and WPS software. It supports CP/M-80 and COS-310 operating systems, and the LQP03, LQP02, LA100 and LA50 printers. Customer-installable options include a Z80A auxiliary processor board and an integral modem.

Features

- 6120 microprocessor
- 96 KB memory (64 Kwords)
- RS232-C serial printer port
- Asynchronous/synchronous communications port to 9600 baud with full modem control
- Monochrome character cell video output
- Built-in diagnostic firmware
- Switch-selectable (115 V or 230 V) universal power supply
- 5 1/4-inch, 800-KB dual-diskette drive and controller

Ordering Information

Option	Order Code
DECmate III system unit, country kit, 12-inch (13.3-centimeter) monochrome monitor in white phosphor and WPS software.	PC23P-AA
DECmate III system unit, country kit, 12-inch (13.3-centimeter) monochrome monitor in green phosphor and WPS software.	PC23P-AJ
DECmate III system unit, country kit, 12-inch (13.3-centimeter) monochrome monitor in amber phosphor and WPS software.	PC23P-AS
Optional Hardware	
DECmate III auxiliary processor unit.	PC23X-AB
DECmate III integral modem.	PC23X-DA
Optional Software	
DECspell	QWA03-A3
CP/M Operating System	QWA25-A3
COS-310 Operating System	QF310-A3



Product Description

The low-cost DECmate II has been tailored to meet the needs of offices and small businesses. As a small business specialist, DECmate II offers proven word processing, office management and accounting applications. It features enhanced word processing capabilities with software such as Sort, List Processing, Math, and Communications. In addition, two optional auxiliary processors support Digital's CP/M-80 and MS-DOS software for personal computing. This auxiliary processor also supports such business applications as Digital's Accounting System (DAS), a family of integrated accounting packages. In short, DECmate II has been optimized for small business applications, offering a complete "turnkey" business solution.

DECmate II's professional-quality word processing, sorting, list processing, and communications are equally well-suited for offices. Spreadsheet calculator applications quickly project and manipulate results of financial, sales, and manufacturing forecasts that require frequent analysis. Moreover, DECmate II's communications capabilities let users access files and software of host computers that serve entire departments. Its terminal emulation capability makes DECmate II appear to a host as a VT100 family terminal. This capability enables offices throughout an organization to run an assortment of sophisticated, menu-driven office applications that reside on host systems in addition to those available on DECmate II. DECmate II can also transfer files to and from other DECmate II personal computers by using its document and character file transfer capabilities.

Features

- 6120 microprocessor
- 96 KB memory (64 Kwords)
- RS232-C serial printer port
- Asynchronous/synchronous communications port to 9600 baud with full modem control
- Monochrome character cell video output
- Built-in diagnostic firmware
- Switch-selectable (115 V or 230 V) universal power supply
- 5¹/₄-inch 800 KB dual-diskette drive and controller

System Expansion

There are three dedicated slots for customer-installable option modules on the system board.

Memory Expansion

DECmate II systems come with a standard maximum memory size of 96 Kbytes. The optional CP/M module contains a Z80 microprocessor and 64 Kbytes of memory for use with CP/M applications. The optional extended processing unit contains an additional 256 KB or 512 KB for use with CP/M and MS-DOS applications.

Mass Storage Expansion

A second 800 KB RX50 dual-diskette subsystem can be installed internally in the system unit for 1.6 MB of on-line diskette storage. An optional 5 or 10 Mbytes hard disk drive, mounted where the second diskette drive would normally be placed, can also be added internally for a maximum total of 5.8-10.8 Mbytes of on-line storage.

DECmate II Order Codes

Option		Order Code
DECmate II system unit.		PC278-A
13.3 cm (12 in) monochrome monitor in white phosphor.		VR201-A
13.3 cm (12 in) monochrome monitor in green phosphor.		VR201-B
13.3 cm (12 in) monochrome monitor in amber phosphor.		VR201-C
Country kit with keyboard, keyboard cable, power cord, and user documentation in the appropriate national language.		PC2K1-A*
*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.		
E—United Kingdom	G—Germany	H—Netherlands
I—Italy	P—France	S—Spain
Additional Hardware and Software Keyboard, cable, and power cord.		LK201-B*
*Replace the asterisk in the keyboard set order code with the letter that precedes the desired country/language listed below.		
E—United Kingdom	G—Germany	I—Italy
S—Spain	P—France	
Auxiliary Processor Unit. Contains a Z80 auxiliary processor unit, 64 Kbytes of memory, and an interface to the 12-bit microprocessor for use with CP/M applications. The 8MHz 12-bit microprocessor performs all I/O tasks for the 4 MHz Z80 microprocessor, resulting in a significant performance advantage when running CP/M applications. The module mounts in a dedicated slot on the system board. The CP/M operating system DECmate Version 2.1 QWA25-A3, and DECspell QWA03-A3 can be ordered separately.		PC27X-AB

Option	Order Code
MS-DOS Module. Contains a Z80A and an 8086 auxiliary microprocessor, 256 Kbytes of memory, and an interface to the 12-bit system microprocessor for use with CP/M and MS-DOS applications. The 8MHz 12-bit microprocessor performs all I/O tasks for the 4 MHz Z80A and the 8MHz 8086 microprocessors, resulting in a significant performance advantage when running CP/M and MS-DOS applications. The module mounts in a dedicated slot on the system board and includes the MS-DOS V2.11 operating system, license, and documentation. This module mounts in the same slot as the PC27X-AB, which must be removed before installing this option. The CP/M operating system DECmate Version 2.1 QWA25-A3 can be ordered separately.	PC27X-AH
MS-DOS Module. Contains a Z80A and an 8086 auxiliary microprocessor, 512 Kbytes of memory, and an interface to the 12-bit system microprocessor for use with CP/M and MS-DOS applications. The 8MHz 12-bit microprocessor performs all I/O tasks for the 4 MHz Z80A and the 8MHz 8086 microprocessors, resulting in a significant performance advantage when running CP/M and MS-DOS applications. The module mounts in a dedicated slot on the system board and includes the MS-DOS V2.11 operating system, license, and documentation. This module mounts in the same slot as the PC27X-AB, which must be removed before installing this option. The CP/M operating system DECmate Version 2.1 QWA25-A3 can be ordered separately.	PC27X-AJ
RX01/RX02 Interface Module. Interfaces Digital's 8-inch RX01 and RX02 diskette drives to DECmate II systems. Owners of DECmate I systems can use existing media with DECmate II, or can transfer their files from 8-inch, 500-Kbyte diskettes to 5 1/4-inch, 400-KByte mini-diskettes. This file and drive compatibility ensures smooth system migration. The interface module mounts in a slot dedicated to mass storage and comes with an adapter cable for the RX01/RX02 disk drive.	PC27X-BA
Graphics Option. Contains a graphics board and the Graphics Terminal Emulator software which allows your DECmate II to act as a TIA certified Level 1 or 2 text/graphics terminal. You can connect to your VAX host and run most Digital software that uses the ReGIS protocol such as VAX DECgraph and VAX Datatrieve on your monochrome and color monitors.	PC27X-CA
Dual-diskette Drive. 5 1/4-inch dual-diskette drive provides additional 800 Kbyte of on-line storage on two 400 Kbyte formatted diskettes. When added to DECmate II personal computers, total on-line storage capacity is increased to 1.6 Mbytes. Drive unit utilizes two double-density diskettes rotated by a single spindle.	RX50-XA

Option	Order Code
Hard-disk Drive. 10-Mbyte, 5 ¹ / ₄ -inch hard disk drive provides additional internal storage to the 800 Kbytes of diskette storage available inside DECmate II's system unit. This compact high-performance disk subsystem based on Winchester technology features a 5-Mbit per second transfer rate and an average access time of 85 milliseconds. The hard disk drive subsystem includes the hard disk interface module for operation. Order RCD50-CB for a 5-Mbyte drive.	RCD51-CA
Floorstand Unit for PC278-A. Enclosure for vertical mounting of the DECmate II system unit. Provides a stable platform when system unit is placed on the floor. Raised pedestal base also provides adequate room for power supply cooling fans.	PCXXF-BA
COS-310 Operating System. Version 9.2 of the commercial operating system developed by Digital. Enhancements include support for the RX50 diskette drive and LA100 printer, in addition to various refinements. DIBOL-8 and DIBOL-11 are included with COS-310. COS-310 will accommodate user-developed application packages and will also run selected application currently available on RX02 diskette media.	QF310-A3
COS-310 License only. License-only version of the COS-310 operating system.	QF310-C3
DECmate/WPS. DECmate Version 2.0 word processing system software. WPS contains advanced word processing capabilities and features. These include column cut and paste to revise tabular data, technical character set support for scientific/technical document preparation, footnoting for manuscripts and legal documents, 238 character wide documents for financial applications, 100 user defined keys for enhanced ease of use, multiple indent tabs for outlines and support of the Winchester disk system for increased system performance and larger documents (1 Mbyte). In addition, the WPS list processing, math, sort, and communications software allows the DECmate to function as a full function multipurpose office management workstation.	QWA01-A3
DECmate/WPS DECspell. Checks for spelling errors, drawing on a list of about 76,000 words with correct spelling and capitalization based on the American Heritage Dictionary by Houghton Mifflin Company. Requires PC27X-AB, PC27X-AH, or the PC27X-AJ option.	QWAO3-A3
CP/M Operating System. Includes the CP/M-80 Operating System, license, and user documentation. Includes the WPS Convert Utility for inserting CP/M text files into WPS documents and WPS documents into CP/M text files. Runs on the PC27X-AH and the PC27X-AJ options.	QWA25-A3
Refer to the <i>Personal Computer Catalog</i> for a complete guide to personal computing software.	



Product Description

The Professional 300 Series computers bring the power and versatility of a personal PDP-11 computer to your desktop. With its outstanding communications, graphics, and processing capabilities, a Professional is ideal both as a workstation in a larger computing environment and as an independent personal system.

The Professional 300 Series includes the Professional 350 and the Professional 380. Both are 16-bit processors, with a PDP-11/23-PLUS microprocessor for the 350, and the PDP-11/70 Extended Instruction Set for the 380. The Professional 380 is an enhanced Professional 350, and features even faster processing time for CPU-intensive processing; support for interlaced graphics in addition to the 350's already high-resolution video bit-mapped graphics; and five option slots instead of the three option slots available for expansion on the 350.

As a PDP-11, the Professional supports a wide range of operating systems and applications that are compatible with products available on Digital's larger PDP-11 and VAX computers. This compatibility means that the Professional can quickly take its place in a distributed processing environment, sharing both code and data with other systems.

Operating systems available for the Professional include familiar members of the Digital operating system family as well as several other industry standards. The Professional Operating System (P/OS), designed specifically for the Professional, is an enhanced subset of Digital's popular RSX-11M-PLUS operating system and features VAX and PDP-11 file structure compatibility and a choice of user interfaces. In most cases, software developed for RSX systems will run under P/OS with little or no modification. Alternate operating systems include Digital's RT-11 and CTS-300, and CP/M-80, p-System, PRO/VENIX, Idris, XENIX, and MUMPS.

The Professional's extensive communications support – including PRO/DECnet and packages to share information with other Professionals, PDP-11s, VAXes, and IBM equipment and the Professional's support for DECnet – simplify sharing information between systems, and facilitate establishing a distributed processing environment.

High-resolution video bit-map graphics are another Professional 300 Series hallmark. With the extended bit-map module and a color monitor, the Professional can also produce color graphics and display 8 colors out of a palette of 256 (out of a palette of 4096 with the interlaced graphics on the 380).

Features

- PDP-11/23-PLUS 16-bit microprocessor for the 350; PDP-11/70 extended instruction set for the 380
- Memory management unit
- 512 Kbytes memory
- Time-of-day clock with battery back-up
- Bit-mapped video controller (960 × 240 for the 350 and 380; optional 960 × 480 interlaced for the 380)
- RS232-C serial printer port
- Asynchronous and bit or byte synchronous communications port, up to 9600 baud with full modem control
- RS170-compatible, monochrome bit-mapped video output
- Built-in diagnostic firmware with graphics display
- Switch-selectable (115V or 230V) universal power supply
- 5¼-inch (13.3 cm) 800 Kbytes dual-diskette drive and controller
- Standard Floating Point Adapter providing up to 17 digits of precision
- An NI port to support PRO/DECnet

System Expansion

The Professional 350 has three slots available for customer installable option modules. The Professional 380 has five option slots available for expansion.

Memory Expansion

Adding additional memory to the Professional 350 or 380 increases the computer's overall system performance by enabling larger programs to reside in memory.

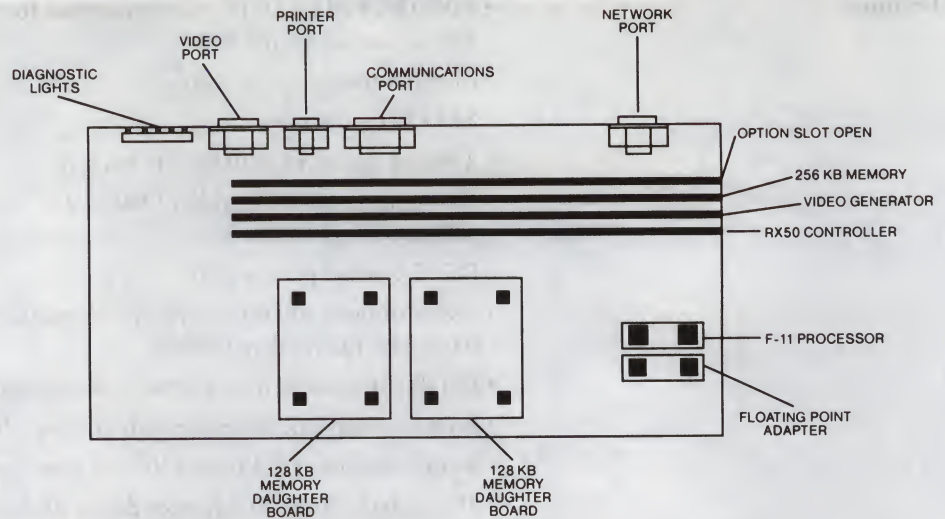
The Professional 350 memory can be extended up to 1 Mbyte in increments of 256 Kbytes. Each 256 Kbyte memory option occupies one option slot. The Professional 380 can be extended up to 1 Mbyte with the 512-Kbyte memory option module that is designed to reside on the system module.

Mass Storage Expansion

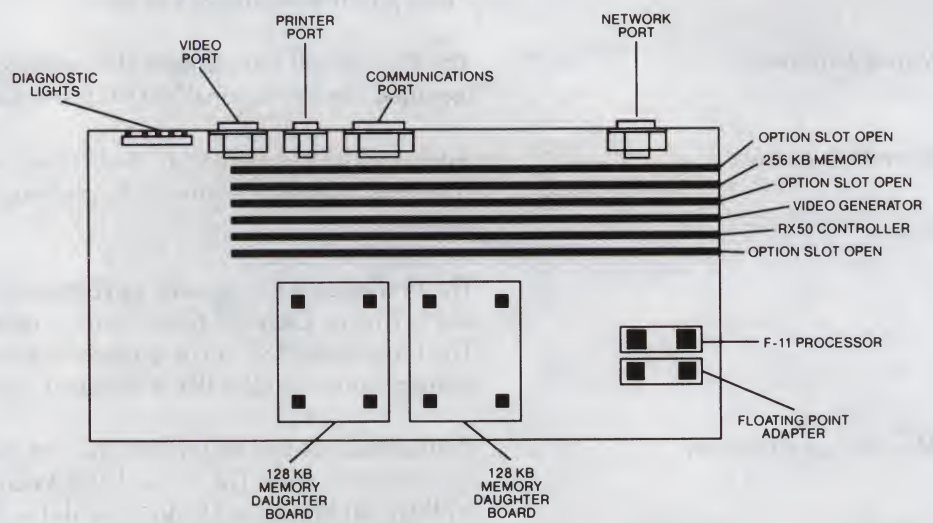
Professional 350 and 380 system units are fully configured with an 800-Kbyte RX50 diskette drive. The 350 and 380 system units can also accommodate a 5-Mbyte, 10-Mbyte, or 33-Mbyte hard-disk option.

System Hardware Order Codes

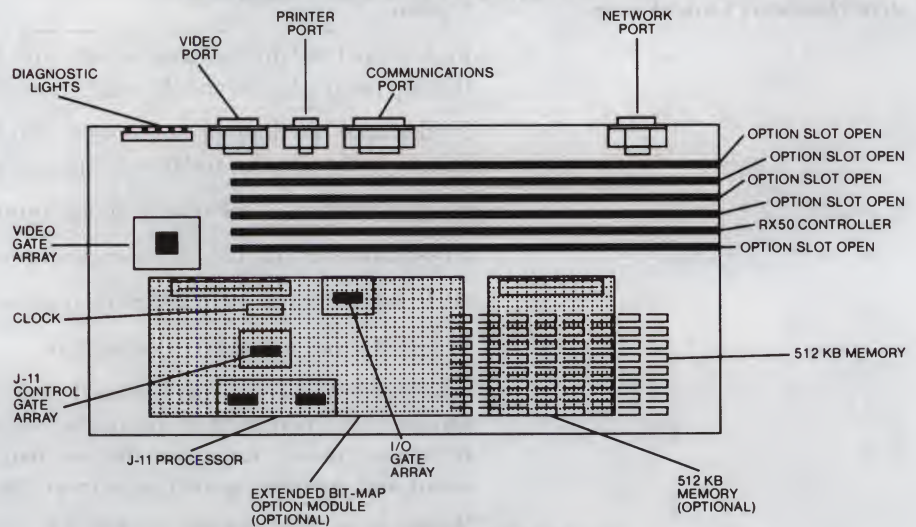
Option		Order Code
Professional 350 floppy-based system with 512-Kbyte memory, floating point adapter, and three additional option slots		PC350-D2
Professional 380 floppy-based system with 512-Kbyte memory, floating point adapter, and five additional option slots		PC380-A
30.4-centimeter (12-inch) white monochrome monitor		VR201-A
30.4-centimeter (12-inch) green monochrome monitor		VR201-B
30.4-centimeter (12-inch) amber monochrome monitor		VR201-C
33.0-centimeter (13-inch) color monitor		VR241-AA
Country kit with keyboard, keyboard cable, power cord, and user documentation in appropriate national language. A computer-based instruction diskette, hardware exerciser, editor, and operating system software are also included.		PC3K1-A*
*Replace the asterisk in the country kit order code with the letter that precedes the desired country/language listed below.		
B—Belgium	D—Denmark	E—United Kingdom
F—Finland	G—Germany	H—Netherlands
I—Italy	K—French-speaking Switzerland	L—German-speaking Switzerland
M—Sweden	N—Norway	P—France



PROFESSIONAL 325 SYSTEM MODULE LAYOUT



PROFESSIONAL 350 SYSTEM MODULE LAYOUT



PROFESSIONAL 380 SYSTEM MODULE LAYOUT

Hardware Options Order Codes

Option	Order Code
256-Kbyte Memory Option for Professional 350. Provides 256 Kbytes of additional MOS memory for the Professional, increasing total memory size to 1 Mbyte in 256-Kbyte increments. Each 256-Kbyte memory option occupies one option slot.	MSC11-CK
512-Kbyte Memory Option for Professional 380. 512-Kbyte RAM daughter module designed to reside on the system module. Provides 512 Kbytes of additional MOS memory for the Professional 380, increasing total memory size to 1 Mbyte.	MSC11-B
CP/M Option. Contains a Z80 auxiliary processor unit, 64 Kbytes of memory, and an interface to the Professional's processor for use with CP/M applications. Allows user to run 8-bit CP/M applications in addition to P/OS 16-bit software. Includes the CP/M operating system, license, and user documentation. Module occupies one option slot.	PC3XS-AA
Hard-Disk Drive. 5-Mbyte 5 ¹ / ₄ -inch hard disk drive and controller. This compact, high-performance disk subsystem features a 5-Mbit per second transfer rate and an average access time of 170 milliseconds. Controller module occupies one option slot.	RCD50-A
Hard-Disk Drive. 10-Mbyte 5 ¹ / ₄ -inch hard disk drive and controller. This compact, high-performance disk subsystem features a 5-Mbit per second transfer rate and an average access time of 85 milliseconds. Controller module occupies one option slot.	RCD51-A
Hard-Disk Drive. 33-Mbyte 5 ¹ / ₄ -inch hard disk drive and controller. This high-performance disk subsystem features a 5-Mbit per second transfer rate and an average access time of 49 milliseconds. Controller module occupies one option slot.	RCD52-A
Extended bit-map module for the Professional 350 only. Adds two bit-map planes to the standard video generator for a total of three planes. Each plane supports a display of 960 × 240 pixels. In addition, the extended bit-map option adds a color output map that can simultaneously display, on a color monitor, eight colors from a palette of 256 colors. Displays eight of a possible 16 shades of gray on the monochrome monitor. Occupies one option slot.	VC241-A
Extended bit-map module for the Professional 380 only. A single daughter bit-mapping module that plugs directly into the Professional 380 system module in the same manner as the MSC11-B memory option. Adds two bit-map planes to the standard video generator for a total of three planes. Each plane supports a display of either 960 × 240 pixels or 960 × 480 pixels interlaced. In addition, the extended bit-map option adds a color output map that can simultaneously display, on a color monitor, eight colors from a palette of 4096 colors.	VC241-B
Voice Unit. Provides a microphone and speaker for voice input and output, a telephone dialpad, and nine command keys with associated LEDs. The voice unit is ideal for teleconferences and hands-free telephone operation. In addition, an audio jack accommodates a headset for use when conducting telemarketing operations. The voice unit features the same ergonomic design used by the keyboard.	
<i>Prerequisite:</i> TMS option and PRO/Communications.	DTC11-B

Option	Order Code
Realtime Interface (RTI). I/O interface combines three widely used realtime functions on a single module for scientific/engineering applications. Includes an IEEE-488 general purpose interface bus for control of up to 15 compatible devices; a two-line RS232-C/423-compatible serial asynchronous port with user-selectable baud rates (50 to 9600 baud); and a 24-line parallel port with 16 data lines and 8 control lines. IEEE and serial interface allows the Professional 350 or 380 to control and acquire data from external devices such as analytical instruments and automatic test equipment. Parallel interface enables users to acquire binary coded decimal inputs. All three interfaces can be used with compatible third-party products to provide analog I/O.	PC3XX-AA
RTI Connector Pod. Connector Box and cable for interfacing to RTI back panel connector.	PC3XX-AB
Y-Cable for Serial I/O for RTI. Not needed if using RTI Connector Pod.	BCC10-03
IEEE Standard Connector for RTI. Not needed if using RTI Connector Pod.	BCC11-03
Parallel I/O Cable for RTI. Not needed if using RTI Connector Pod.	BCC12-03
DECNA Ethernet Controller (DECNA). The DECNA hardware component allows Professional 350 and 380 systems to tie into high-speed DECnet local area networks (LANs). It contains 128 Kbytes of memory, provides on-board self-diagnostics, and includes a 5-meter transceiver cable. The DECNA is a standard-sized option card which occupies one slot in the Professional 350 or 380 option module cage.	DECNA-K
Enclosure for vertical mounting of the Professional 350 or 380 system unit. Provides a stable platform when system unit is removed from work surface and placed on the floor. Raised pedestal base also provides adequate room for power supply cooling fans.	PCXXF-AA

Operating Systems

Professional Operating System (P/OS)

The Professional Operating System (P/OS) is an enhanced subset of Digital's popular PDP-11/RSX-11M-PLUS operating system. P/OS is a multitasking, resource-sharing, realtime operating system with VAX and PDP-11 file structure compatibility. In recognition of the varying needs of Professional users, P/OS offers a choice of user interfaces. For technical or experienced personnel, there is a subset of the traditional Digital Command Language (DCL). For less experienced people, there is the P/OS menu system that is characterized by user-friendly menus, on-screen prompts, and abundant in-context help.

The P/OS Files-11 file structure gives the Professional compatibility with Digital's VAX and PDP-11 systems. P/OS serves as the primary operating system for the Professional's outstanding communications and graphics capabilities, as well as for the Professional's extensive listing of application development products. P/OS Version 2.0 (Hard Disk) includes support for PRO/DECnet and virtual device metafiles.

Order Numbers

QBA13-H3 (Version 1.7, Diskette)

QBA02-H3 (Version 2.0, Hard Disk)

RT-11 on the Professional

RT-11 native on the Professional is nearly identical to the traditional RT-11 system, featuring the same compact size, speed, and simplicity of use that have made RT so popular. Version 5.1 of RT-11 allows users to take advantage of the Professional's video bit map, and provides the VTCOM communications option to enable Professionals to emulate a VT100 terminal for communication with host systems, including VAX. RT-11 provides a full development environment on the Professional 325, 350, and 380.

Order Number QBA39-H3

The following languages are available under RT-11 on the Professional:

Order Numbers

QA609-C3 FORTRAN-77 for RT-11

QB813-A3 FORTRAN IV for RT-11 on the Professional

QB913-A3 BASIC-11 for RT-11 on the Professional

Professional CTS-300

Professional CTS-300 is a commercial operating system that bundles RT-11 with DIBOL-83. CTS-300 is a disk-based single-user multitasking system designed to support commercial applications on the Professional and other small PDP-11 based Digital computers. DIBOL-83 is a high-level procedural language designed specifically for interactive business data processing, and is highly compatible with DIBOL-83 implementations running on other operating systems, including VAX/VMS, RSX-11M-PLUS, RSTE/E and P/OS.

Order Number QB354-H3

p-System

UCSD p-System provides a portable environment for developing and executing applications software. p-System application programs written for one microcomputer can run on others without recompilation. The p-System programs are written in p-code for the "p-machine," a pseudo-machine or idealized version of a microcomputer. p-code is then executed by the p-machine emulator written in the native language of the microcomputer. The Professional 300 Series supports FORTRAN-77 and UCSD-Pascal for p-System. p-System runs under the P/OS operating system on either a diskette or disk-based Professional.

Order Numbers

QA579-C3 (diskette based)

QA112-C3 (hard disk)

QA111-C3 (hard disk with UCSD Pascal)

PRO/VENIX™

PRO/VENIX is a genuine UNIX operating system developed specifically for the Professional 300 Series by VenturCom, Inc. Based on Version 7 UNIX and incorporating several of the popular University of California at Berkeley extensions, PRO/VENIX carries an AT&T System V binary license to accommodate newer releases of AT&T UNIX. PRO/VENIX is the UNIX operating system of choice for the Professional because of its special features, such as graphics support and code mapping, that take advantage of the Professional's unique capabilities. PRO/VENIX turns the Professional into a multiuser, realtime UNIX workstation.

Order Number QA718-C3

XENIX

XENIX is an enhanced version of the Bell Labs UNIX operating system. It is licensed by Microsoft Corporation and AT&T. XENIX offers both multiuser and multitasking capabilities and is available in three packages, letting you choose from a simple timesharing system or the timesharing system combined with software development or with text processing operations.

Ordering Information

The Santa Cruz Operation, Inc.
500 Chestnut Street, Box 1900
Santa Cruz, CA 95061
(408) 425-7222

Idris

Idris is a fast, compact, multitasking rewrite of the UNIX operating system. It is specifically designed for use on microcomputers, being half the size of conventional UNIX systems. Despite its compact size, Idris conforms to the latest revisions of the UNIX/usr/group standards, and enables the Professional to support three terminals simultaneously.

Ordering Information

Whitesmiths, Ltd.
97 Lowell Road
Concord, Ma.
(617) 369-8499

STANDARD MICRO MUMPS 300

STANDARD MICRO MUMPS 300 (SMM 300) combines the well-known MUMPS operating system, a transparent database management system, and an ANSI standard high-level language to offer a low-cost, multi-user database management system. It supports a broad range of applications, including medical, financial management, process control, order entry, and other general business uses. The SMM 300 system takes advantage of the Professional's minicomputer processor and architecture to allow you to connect up to five terminals to a Professional 300 Series system.

Ordering Information

Creative Socio-Medics, Inc.
16 East 32nd Street
New York, NY 10016

CP/M-80

PRO/CP/M-80 Version 1.0 allows the Professional 300 Series, both diskette and hard disk, to run the many application packages that are available for only CP/M-80. It also enables CP/M-80 Version 2.2 applications developed on Digital's Rainbow and DECmate personal computers to run on the Professional without modification, as long as they do not directly access hardware devices. PRO/CP/M-80 will allow transfer of ASCII files between P/OS and CP/M.

Order Number PC3XS-AA

Ordering Information for Development Tools

Development Tool	RSX-11M/M-PLUS VAX/VMS		P/OS
PRO/TOOL KIT			QBA14-A3
Professional Host Tool Kit	QJ071-AD QJ071-AH QJ071-AM QJ071-AV	QC350-AG QD350-AG QE350-AY	
Professional Tool Kit FORTRAN-77	QJ074-AD QJ074-AH QJ074-AM QJ074-AV	QC353-AG QD353-AG QE353-AY	QBA15-A3
PRO/Tool Kit FORTRAN-77 DEBUG	QJ079-AD QJ079-AH QJ079-AM QJ079-AV	QC421-AG QD421-AG QE421-AY	QBA21-A3
Professional Tool Kit Pascal	QJ082-AD QJ082-AH QJ082-AM QJ082-AV	QC715-AG QD715-AG QE715-AY	QBA18-A3
Professional Tool Kit COBOL-81	QJ081-AD QJ081-AH QJ081-AM QJ081-AV	QC714-AG QD714-AG QE714-AY	QBA19-A3
Professional Tool Kit DIBOL	QJ369-AD QJ369-AH QJ369-AM QJ369-AV	QC356-AG QD356-AG QE356-AY	QBA16-A3
Professional Tool Kit BASIC-PLUS-2	QJ073-AD QJ073-AH QJ073-AM QJ073-AV	QC352-AH QD352-AH QD352-AM QD352-AV QE352-AM QE352-AV	QBA17-A3
Professional Realtime Interface Library	QC355-AG QD355-AG QE355-AY	QJ076-AH QJ076-AM	QBA58-A3
PRO/BASIC			QBA04-A3
FORTRAN-77 for p-System			QA114-C3
UCSD Pascal			QA113-C3
PRO/FORTRAN IV (RT-11)			QB813-A3
PRO/BASIC-11 (RT-11)			QB913-A3
FORTRAN-77 (RT-11)			QA609-C3

KEY: AD 9 TRK Magtape

AH RL02 Disk Cartridge

AM 1600 BPI Magtape

AV RK07 Disk Cartridge

AG TU58 Kit

AY RX01 Kit

QC Products run on VAX-11/730

QD Products run on VAX-11/750

QE Products run on VAX-11/780

Applications Available for P/OS

Integrated Software

PRO/Applications Starter Kit

The PRO/Applications Starter Kit provides an integrated set of five of the most important and popular types of programs for the microcomputer. It includes PRO/Spreadsheet, PRO/Graph, PRO/DataManager, PROSE (a text editor), and DECLander (a video game). Each program includes all the basic features of its type of program – all in an easy-to-learn, cost-effective package.

Order Number QBA25-A3 (Disk-Based)

Order Number QBA26-A3 (Diskette-Based)

Synergy

Synergy is an integrated set of applications that operate in a window environment. Synergy applications allow you to produce professional-looking reports that combine text and graphics, and to develop and share data between applications. Synergy includes the PROSE PLUS text and graphics editor, Synergy DataManager, Synergy Spreadsheet, Synergy Graph, Synergy Communications, and Synergy File Services. It runs on a hard-disk-based Professional.

Order Number QBA76-A3

Personal Productivity

PRO/Office Workstation

PRO/Office Workstation brings a powerful office automation system to the Professional 350 and 380, especially where Digital's VAX-ALL-IN-1 systems are already in use. PRO/Office Workstation provides advanced office automation capabilities directly on the Professional, including word processing and document preparation, local document storage, and an interface that can be tailored to your needs and experience. When connected to a VAX-ALL-IN-1 system, PRO/Office Workstation shows its full potential and allows for convenient, instantaneous sharing of information via electronic mail, document processing, database access and retrieval, and even graphics.

Pro/Office Workstation runs on a Professional equipped with a 10-Mbyte or larger hard disk, P/OS Hard Disk Version 1.7 or later, and PRO/Communications Version 1.7 or later.

Order Number QBA64-A3

Wall Street Connection

The Wall Street connection provides an enhanced user interface to Dow Jones News/Retrieval Service. It augments the normal Dow Jones News/Retrieval subscription, which is purchased separately from Dow JonesTM and Company.

Order Number QA719-C3

Communications

PRO/DECnet

PRO/DECnet ties the Professional into the larger Digital Network Architecture that allows full compatibility between Professionals, larger PDP-11s, VAXes, and DECsystem 10 and 20 mainframes. Using PRO/DECnet, you can create small local area networks of Professionals and other Digital computers, or tie into existing DECnet networks of any size. In either case, the hard-disk-based Professional 350 or 380 becomes a fully functional end node in the network. PRO/DECnet is implemented through Ethernet, an industry-standard method of handling local area networks (LANs). PRO/DECnet requires the DECNA Ethernet Controller and runs under P/OS Version 2.0 or later.

Order Number QBA44-H3

PRO/Communications

PRO/Communications is the primary communications package for the Professional 300 Series, performing a wide range of asynchronous communications functions. Its powerful communications services include terminal emulation, file transfer (in general with full error checking), and file conversion. PRO/Communications 1.8 also supports some of Digital's newest hardware innovations, including Mini-Exchange and voice/data communication with TMS.

Order Numbers

QBA05 (Hard Disk)
QBE05 (Hard Disk, Europe)
QBA45 (Diskette)
QBE45 (Diskette, Europe)

PRO 2780/3780

The PRO 2780/3780 communications facility provides a hard-disk-based Professional 300 Series workstation with the ability to communicate with other devices operating within International Business Machine (IBM) Binary Synchronous Data Link (BSC) protocol environments. Capabilities include the ability to work as a 2780/3780 Remote Job Entry station, use local printers from Digital to emulate IBM 3287 printers, and exchange information with other computers that have 2780/3780 communications capabilities, including other Professionals.

Order Number QBA47-A3

PRO/SNA Terminal and Printer Emulator

The PRO/SNA Terminal and Printer Emulator (PRO/SNA/TE) enables a hard-disk-based Professional to emulate an IBM 3270 terminal to perform interactive data entry, program development, and inquiry, update and transaction processing of the host computer's central data base. The integrated printer emulation feature lets you print out IBM files by using Digital's LA50, LA100, or LQP02 printers to emulate an IBM 3287 printer.

Order Number QBA49-A3

PRO/SNA Remote Job Entry

The PRO/SNA Remote Job Entry (PRO/SNA/RJE) system enables a hard-disk-based Professional to function as an IBM 3770 RJE workstation. While in this mode, the Professional can submit batch requests to an IBM mainframe operating in an SNA environment that supports Job Entry System (JES) I and II.

Order Number QBA48-A3

Database Management

PRO/DATATRIEVE

PRO/DATATRIEVE is a database system that includes an interactive query language that lets you find information quickly and retrieve that information in nearly any format you require. PRO/DATATRIEVE Report Writer lets you organize and summarize information in your database in clear, easy-to-read, meaningful reports. The PRO/DATATRIEVE Data Dictionary stores a wealth of information about your database and helps you with your query, update, and reporting operations. Version 2.0 of PRO/DATATRIEVE includes a Local Callable Interface that allows applications to call PRO/DATATRIEVE. PRO/DATATRIEVE runs on a hard-disk-based Professional.

Order Number QBA43-A3

PRO/RDT

PRO/RDT lets you extract subsets of data from a remote Professional, VAX, DEC-20, or PDP-11 host. The PRO/RDT facility uses DECnet as the transfer medium, and DATATRIEVE and its protocols to control information transfer. The PRO/DATATRIEVE Distributed Data Management Facility (DDMF), which is packaged with the PRO/RDT application, lets the Professional be a remote host for other Professionals and must be an installed task on host systems. PRO/RDT runs on a hard-disk-based Professional equipped with a DECNA Ethernet Controller, P/OS Hard Disk Version 2.0 or later, PRO/DECnet, and PRO/DATATRIEVE Version 2.0 or later.

Order Number QBA71-A3

ADR/DATA

ADR/DATA is a relational data management system designed to combine powerful database capabilities and simplified operation. It performs a full range of information storage, reporting, manipulation, and maintenance functions, and is well-suited for applications such as budgeting, production analysis, inventory control, consolidations, personnel reporting, and manpower studies.

Order Number QA564-C3

Spreadsheets

Supercomp-Twenty

Supercomp-Twenty brings all the advantages of traditional spreadsheets to the P/OS-based Professional, then adds its own special capabilities. Supercomp-Twenty models and data created on the Professional 300 Series can quickly be copied or consolidated on another Professional, a VAX/VMS system, or a PDP-11 running RSX-11M, RSX-11M-PLUS, RSTS/E, or RT-11. Other Supercomp-Twenty advantages include a huge worksheet capacity (up to 1000 columns or rows), modeling techniques comparable to a financial planning language, simple operation, and a general data interface that lets Supercomp-Twenty accept data files and other information from a broad range of database and graphics programs.

Order Number QA476-C3

Decision Support

MAPS/PRO™ Financial Modeling

MAPS/Pro Financial Modeling provides financial planning workstation for budgeting, profit and product planning, variance reporting and financial analysis. Designed for the hard-disk-based Professional 350 or 380, MAPS/Pro can exchange models and data with a VAX or PDP-11 running compatible MAPS/Host™ software.

Order Number QA431-C3

TK!Solver

TK!Solver processes equations. With TK!Solver, scientists, engineers, students, financial analysts, and others can concentrate on solving problems while their Professional crunches numbers. TK!Solver includes 34 built-in functions, including trigonometric, logarithmic, and financial functions, to streamline the formulation of complex equations. TK!Solver can accept data in the DIF™ file format that is used in MAPS PRO/Graphics, ATHENA/Graph, and many other programs.

Order Number QA180-C3

TK!SolverPacks

TK!SolverPacks are add-on modules for TK!Solver that tailor the number-crunching power of TK! to the requirements of specific professions. Each TK!SolverPack contains all the equations, variables, conversion units, and functions required to model the most common problems in a given discipline. The Professional 300 Series supports Financial Management TK!SolverPack and Mechanical Engineering TK!SolverPack.

Order Numbers

QA434-C3 Financial Management TK!SolverPack

QA442-C3 Mechanical Engineering TK!SolverPack

RS/1

RS/1, the Research System, integrates the four most important software capabilities for the laboratory: database management, analysis, modeling, and graphics input. RS/1 includes a full range of data-handling techniques that give researchers complete control of their data, using simple English-based commands. RS/1 on a hard-disk-based Professional (10 Mbyte or larger recommended) is a full implementation of RS/1-PLUS, which is also available on Digital's VAX and PDP-11 computers.

Order Number QA497-C3

SPSS/PRO

SPSSTM/PRO is a complete information analysis system for the Professional 300 Series. The system performs advanced statistical functions, manages data files, and produces presentation-ready reports. Versions of SPSS are also available on Digital's VAX, DECsystem-10, DECsystem-20, and PDP-11 computers. SPSS/PRO runs on a Professional equipped with a 10-Mbyte or larger hard disk.

Ordering Information

SPSS, Inc.
444 N. Michigan Avenue
Chicago, IL 60611
(312) 329-2400

UMD (Universal Microprocessor Development Systems)

UMDTM is a microprocessor software development system for programming special-function chips for a wide range of products and processes. It contains the cross-assemblers, utilities and symbolic debuggers for the following microprocessors: Intel 8086, 8085, 8048, 8051, Motorola 68000, 6809, 6805, 6800 Series, Zilog Z-80, Z-8000, Rockwell 6502, and TI 9900, 9989.

Ordering Information

Boston Systems Office
469 Moody Street
Waltham, MA 02154
(617) 894-7800

ADR/GRAPHTM

ADR/GRAPH is a powerful menu-driven business graphics program which provides pie, exploded pie, line bar, stacked bar, point, segment, and bubble charts. Additionally, ADR/GRAPH directly reads and plots ADR/DATA files, provides data handling capabilities and graphs output from Supercomp-Twenty. Full multinational character support is included. Graphs can be output on a LA50, LA100, LVP16, and Hewlett-Packard 2-color and 6-color pen plotters. ADR/GRAPH runs on the PRO 300 series, PDP11, and VAX systems (subject to local availability).

Order Number QUE73-C3

PRO/SIGHT

PRO/SIGHT is a full-function drawing package that allows graphics arts professionals and inexperienced users alike to take full advantage of the Professional's outstanding graphics capabilities to create striking, colorful graphics. Its easy-to-use, menu-driven operations include flexible color and fill pattern selection, extensive line drawing support, and text positioning within graphics. Users can create using the keyboard, a mouse, and/or a graphics tablet. PRO/SIGHT runs on a hard-disk-based Professional.

Order Number QBA35-C3

Graphics

PRO/NAPLPS

PRO/NAPLPS is a software product that allows the Professional to emulate a NAPLPS videotex terminal. NAPLPS, the North American Presentation Level Protocol, is the ANSI/CSA protocol for videotex. With PRO/NAPLPS, the Professional 350 or 380 can access remote videotex data bases, receive NAPLPS-encoded graphics and text information, and decode and display that information on the screen. PRO/NAPLPS runs on a hard-disk-based Professional equipped with the Extended Bit-Map Graphics Module and PRO/Communications Version 1.8 or later.

Order Number QBA24-A3

PC4014 Terminal Emulator

The PC4014 Terminal Emulator allows the Professional 350 and 380 to use the industry-standard Tektronix 4014 protocol to complete tasks that require access to 4014 host applications. In addition to emulating most 4014 operations, PC4014 offers enhanced features such as the ability to store graphic images from the host as files on the Professional. The emulator is easy to use and requires very little user intervention. The PC4014 Terminal Emulator runs on a hard-disk-based Professional equipped with PRO/Communications Version 1.7 or later.

Order Number QA761-C3

Word Processing

PROSE PLUS

PROSE PLUS integrates time-saving word-processing features with a full-screen graphics editor to provide an ideal writing and presentation tool for managers. The graphics editor incorporates sophisticated drawing routines to let you create title pages, diagrams, organizational charts, schedules, call outs, and other graphic elements. Text and graphics can be arranged and combined on the screen or printed page to create effective, appealing presentations. PROSE PLUS runs on a Professional equipped with hard-disk storage and P/OS Version 1.7 or later.

Order Number QBA11-A3

CT*OSTM

CT*OS (Compu-Tome Office System) is a full-featured word processing system designed to emulate Digital's WPS78 word processing system, containing the same menu interface and most of the features users enjoy in Digital word processing. With its scientific character set, CT*OS is particularly useful in technical or academic environments. CT*OS runs on a hard-disk-based Professional.

Order Number QA767-C3

DECtextTM

DECtext is a powerful menu-driven word processing program for the PRO 300, PDP-11, and VAX systems. DECtext provides flexible document preparation, text formatting, list processing and automatic mailing from customer files, automatic hyphenation, calculations, text libraries, numerous printing options and other features. DECtext is ideal for both occasional and dedicated users, and fully supports all European multinational characters, and exists in most languages. Supercomp-Twenty, ADR/DATA and other files can be brought into DECtext documents.

Order Number QGE03-C3

AVID

AVID™, developed by Advanced Interactive Systems, Inc., is an advanced Computer Based Instruction system for academic, business and industrial training, computer simulation and modeling and information retrieval and file management.

Ordering Information

Advanced Interactive Systems, Inc.

6 Darby Road

Paoli, PA 19031

(215)644-7721

Specialty**MMS-1**

MMS-1™ is an easy-to-use Materials Management System designed to control and manage inventory balances in stockrooms, warehouses, or supply centers. MMS-1 handles the three basic materials handling transactions—receiving stock, picking stock items, and inventory counts—with efficiency and speed. Audit control functions track shortages and backorders, and report facilities provide information management needs to maintain adequate inventories and to monitor system activity. MMS-1 runs on a hard-disk-based Professional.

Order Number QA560-C3

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microMagic is a trademark of Intelligent Industrial Systems, Inc.

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UNIX is a trademark of Bell Laboratories.

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Z80 is a trademark of Zilog, Inc.

Product Description

DECtouch is a touch sensitive, modified VR241 color monitor designed for use in a Professional 350 workstation. DETouch consists of a color monitor, a resistive touch panel, a DETouch controller module, and connector cable.

DECTouch controller firmware is included in the module to control the I/O ports, decode commands from the Professional computer, transmit data, and perform all diagnostic and self-tests. In addition to touch screen, DETouch supports serial mouse, quadrature mouse, graphics tablet, and joysticks.

A positional device library is provided to interface applications software to the positional device driver. Applications software can easily be modified to call the appropriate library element to connect or disconnect devices, request positional data, or change the attributes of the positional devices.

While DETouch was developed to facilitate the design and delivery of IVIS interactive courseware, it will also support additional applications.

Performance Specifications

Specifications and requirements for the DETouch color monitor are identical to those of the VR241 color monitor, with the following additions:

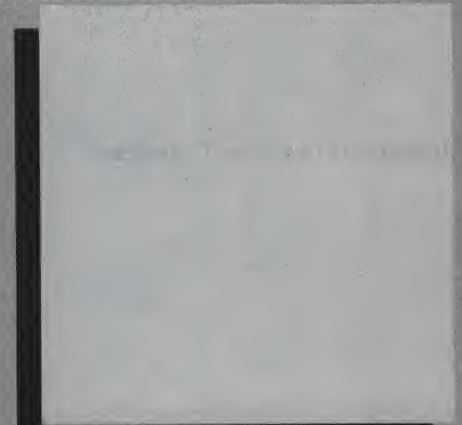
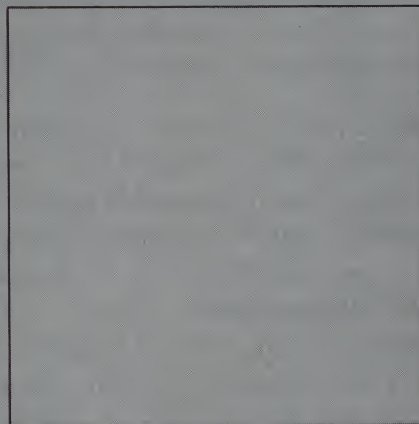
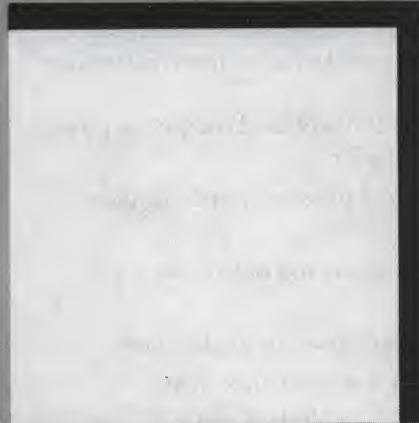
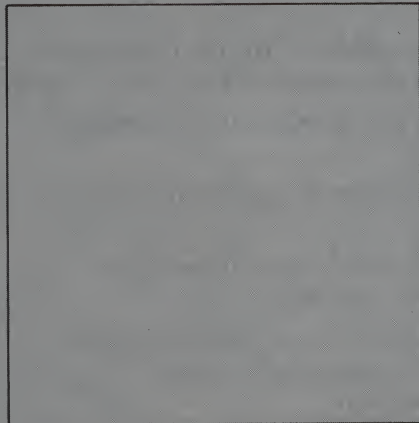
- Activation force: 1-2 ounces nominal (28-56 grams)
- Resolution: .04 inches (1.0mm)
- Sampling rate: 10-400 samples/second (programmable) 100ms-2.5ms/sample corresponds nominally to 10 in./sec drawing speed
- Ports: 2 serial positional device attachment ports with graphics tablet and serial mouse support; 2 parallel positional device attachment ports with joystick or single quadrature mouse support; 1 keyboard port; baud rate (programmable) of 5 to 19.2K
- Software support: DETouch requires P/OS Version 1.7. or 2.0A. A special I/O positional device driver is included with the DETouch controller module to interface the applications software to the Professional 350 personal computer

DECTouch Order Code

Option	Order Code
VR241 terminal with touch screen input	VRTS1-A

the subject matter of the photograph. The subject matter of a photograph is the main focus of the image. It is the central element that the photographer wants to convey to the viewer.

The subject matter of a photograph can be anything from a person to a landscape. It can be a single object or a group of objects. The subject matter is what the photograph is about. It is the main subject of the image.



Information is highly critical to manufacturing operations. It must be right, it must be current, and it must be readily available regardless of local conditions.

To meet these demands, Digital Equipment Corporation has developed a family of industrialized products that combine superior performance with tolerance for manufacturing environments—from extremely harsh industrial to light industrial. Ruggedized hardware including terminals, processors, air-conditioned computer cabinets and keyboards; application software, and analog and digital I/O interfaces. Digital has the products to optimize manufacturing productivity in a number of ways.

Industrial Data Collection

- Terminals that simplify data entry and retrieval for workers and supervisors.
- Industrial packaging that resists the effects of airborne particles, temperature and humidity in most types of manufacturing environments.
- Full-screen terminals that support a wide range of forms transactions.
- Form tractor that allows terminals to be installed on a bench, table or shelf, forming the nucleus of plantwide workstations.
- Environmentally sealed keyboards that operate reliably at harsh worksites where there is a potential for large amounts of down-time if standard keyboards are used.
- Bar code terminals that make data entry faster and easier, and reduce the margin for error.
- Industrial processors for numerical and machine control applications or for general purpose manufacturing computing.
- Industrial computer enclosure designed to house and protect 19-inch rack-mounted equipment for operation in harsh environments.
- Printers that can improve manufacturing productivity by creating and printing CODE 39 barcode, shipping and ID labels, forms, signs and documents (see LXY12/12 in the Terminals and Printers Section).
- Products that are easy to maintain and service.
- Products that are compatible with all Digital host systems and with each other, providing extreme configuration flexibility and a total solution from one vendor.

Industrial Local Area Networks

- Industrial local area networks (ILAN) that provide distributed computing power and I/O capability throughout a manufacturing facility.
- Intelligent subsystems based on Digital's LSI-11/23 processor, enabling independent operation in the event of host outage.
- Fiber optic network links for reliable communications and isolation in harsh industrial environments.
- Network software to manage communications and downline loading tasks.
- Block mode DMA transfers to provide fast, error free communications.
- Terminal interfaces for locating terminals along the multidrop network.

Industrial I/O Systems

- I/O systems to interface a wide range of analog and digital signals to PDP-11 and VAX processors.
- Industrial packaging for installation in factory environments and for easy connection of field wiring.
- High point count I/O subsystems for powerful local control in large process control applications.
- Distributed I/O systems using Digital's ILAN.
- PDP-11 based intelligent controllers for remote widely distributed SCADA applications.
- Standalone controllers that operate from batteries or from ROM-based software for uninterrupted operation in remote unattended locations.

Where can Digital's industrial process control and data collection management equipment be used? In steel mills, warehouses, machine shops, loading docks, rework centers, distribution centers, laboratories—wherever you need them.

For what applications can they be used? Time and attendance, shop floor control, process control, quality control, inventory control, numerical control and machine control—wherever you need easy, efficient data collection and control.

Digital industrialized hardware and software products. Solutions for plant and factory. Put them to work for you.

Product Information

Most commonly used in harsh industrial environments, the RT100 family of ruggedized videoterminals performs where noise, chemical vapors, and dampness are prevalent. Manufacturing plants, automotive production lines, steel foundries, and mines are just a few businesses that require the strength of an RT100, RT102, or RT137 terminal.

A durable steel-casing and membrane-covered keyboard protects the RT100 terminals from airborne dirt and grease particles, liquid spills, and dampness. In addition, cooling fans, heat exchangers or convection cooling devices inside the terminals offset high temperatures common to industrial environments.

Universal RT100 Family Performance Characteristics

- Baud rate: 50 to 19,200 b/s
- Format: 24 lines × 132 characters
- Characters: 7 × 9 dot matrix with descenders
- Character set: 94 displayable-character ASCII set and 32-character special line-drawing graphics set
- Double width/double height characters
- Standard numeric and function keypads
- Bidirectional vertical scrolling
- Selectable smooth or jump scrolling
- Split-screen capability
- Normal or reverse screen image
- Adjustable tabs
- Full-duplex operation
- Keyboard selectable features
- Nonvolatile setup memory
- Cursor control keys
- ANSI/VT52 command modes
- 20-character answerback message
- Selectable XON/XOFF buffer control
- Self-test diagnostics

Environmental

- Operating Temperature: 5°C to 50°C (41°F to 122°F)
- Storage Temperature: -40°C to 66°C (-40°F to 151°F)

Humidity

- Operating: 10% to 90% (noncondensing)
- Storage: 0% to 95% (noncondensing)



Product Information

The RT102 terminals are ruggedized versions of the VT102. The two types of RT102s provide the full functionality and compatibility of the VT102, but are packaged to withstand hostile industrial environments. One model of the RT102 comes packaged with a flat-membrane keyboard and an industrial air filter. The other model is an environmentally sealed version featuring convection cooling and a full-travel membrane keyboard. Both terminals and keyboard are housed in durable metal enclosures. Keyboards are resistant to most liquids, grease, and oil.

Ordering Information

Prerequisite: EIA/CCITT serial line interface or equivalent.

Note: Cables are not provided and must be ordered separately. The recommended cables include BC22B-xx and BC22E-xx for connection to a modem, and BC22D-xx and BC22F-xx for local connection to a line unit. The BCO5F cable is recommended for the 20 mA RT102 interface.

RT102 Order Codes

Option	Order Code
Industrialized VT102 videoterminal with EIA interface.	RT102-AB
Industrialized VT102 videoterminal with 20 mA interface.	RT102-BB
Completely sealed industrialized VT102 videoterminal with tactile feedback keyboard and EIA interface.	RT102-EA
Completely sealed industrialized VT102 videoterminal with tactile feedback keyboard and 20 mA interface.	RT102-FA

Product Information

The RT137 Barcode Terminal combines the features of our ruggedized RT100 terminal with barcode capability, enabling it to handle factory data collection applications that require machine readable input. The terminal reads Code 39, interleaved 2-of-5, 2-of-5, and Code 11.

A barcode reader is designed as an integral part of the RT137 architecture. The RT137 keyboard is a metal template keyboard that consists of barcode symbols representing alphanumeric characters and function key equivalents. For scanning the barcode, a shock- and vibration-resistant light pen is provided. As an alternate to the light pen, a badge slot reader is available for time and attendance applications and labor tracking applications.

Ordering Information

Prerequisite: EIA/CCITT serial line interface or equivalent.

Note: Cables are not provided and must be ordered separately. The recommended cables include BC22B-xx and BC22E-xx for connection to a modem, and BC22D-xx and BC22F-xx for local connection to a line unit. The BCO5F cable is recommended for the 20 mA RT137 interface.

RT137 Order Codes

Option	Order Code
RT100 videoterminal with barcode reader, barcode keyboard, VT100 keyboard, light pen, and EIA interface.	RT137-AA
RT100 videoterminal with barcode reader, barcode keyboard, VT100 keyboard, light pen, and 20 mA interface.	RT137-BA
RT100 videoterminal with barcode reader, barcode keyboard, light pen, and EIA interface.	RT137-AE
RT100 videoterminal with barcode reader, barcode keyboard, light pen, and 20 mA interface.	RT137-BE
RT100 videoterminal with barcode reader, RT1XX-AC keyboard, light pen, and EIA interface.	RT137-AK
RT100 videoterminal with barcode reader, RT1XX-AC keyboard, light pen, and 20 mA interface.	RT137-BK
RT100 videoterminal with barcode reader and EIA interface.	RT137-AM
RT100 videoterminal with barcode reader and 20 mA interface.	RT137-BM
Barcode keyboard.	RT137-AC
Barcode badge slot reader. Features adjustable sensor height and slot width. Especially designed for fast scanning and one-handed operation. Includes a 2-meter (6-foot) cable with 5-pin lock ring connector.	RT137-SR
Barcode ruby wand. Ruggedly constructed visible light pen, highly resistant to mechanical shock and vibration. High first-read rate for barcode printed by dot-matrix printers.	RT7XX-AC

Model	Note	Voltage V	Freq Hz	Phases	Current AC Amps	Thermal Dissipation		NEMA Rec Type	Physical Size			
						Watts	BTUs/HR [KJ/HR]		Height in [cm]	Width in [cm]	Depth in [cm]	Weight lbs [kgs]
RT102-A		240	50-60	1	.52	100	[360]	6-15R	[41.9]	[52.1]	[61.6]	[39.0]
RT102-B		240	50-60	1	.52	100	[360]	6-15R	[41.9]	[52.1]	[61.6]	[39.0]
RT137-A		120	50-60	1	1.60	150	512	5-15R	16.5	20.5	26.5	88.0
RT137-B		120	50-60	1	1.60	150	512	5-15R	16.5	20.5	26.5	88.0

Ordering Information

Options and Accessories

Ruggedized Option and Accessory Order Codes	Option	Order Code
	Plastic membrane keyboard for use with VT100 series terminals. Its durable construction and flat membrane design enable it to withstand physical abuse and a wide range of liquid, solid, and airborne contaminants. Includes a 2-meter (6-foot) coiled cord.	RT1XX-AE
	Environmentally sealed keyboard with typewriterlike keys; fully compatible with the VT100 architecture. The user can disable the setup, break, control, and scroll keys to prevent inadvertent or unauthorized use.	RT1XX-AF
	Industrial membrane keyboard that is fully compatible with the VT100 and RT100 architecture. The keyboard functions are combined with a membrane panel providing a sealed unit. The Mylar™ membrane keyboard is resistant to moisture, dust, grease, and oil. The RT1XX comes with a standard 2-meter (6-foot) coiled cord to attach it to the monitor.	RT1XX-AC

Digital's specialized industrial I/O products provide a variety of information-processing functions that are capable of being linked via a local area communications network.

Plant data processing requirements typically range from production control and monitoring to business and administrative data manipulation. Such diverse information processing needs require a wide selection of specialized computer equipment that, in many cases, can become isolated throughout the plant and can affect management's ability to control and monitor the entire spectrum of operations.

Digital provides manufacturers with the ability to collect, manipulate, and transmit data from all areas within the plant through efficient, realtime use of all computer-based resources in a distributed processing environment. This integrated systems approach to plant management is based on the DECdataway local area communication network at the regulatory and supervisory level.

DECdataway Network Architecture

The DECdataway local area network consists of hardware and software components that form a communication link between a host microprocessor and remote devices such as processors and terminals. The DECdataway is a serial multidrop communications bus that supports as many as 63 node addresses using a single twisted-pair shielded cable. A DECdataway controller located at the host processor polls devices over the bus and emulates a distinct DMA communication channel for each node address. Operating in half-duplex mode at 56 Kbits per second, the DECdataway communication bus has been specially designed to provide maximum data integrity in a plant environment. Cable length can be up to 3 miles long without requiring repeaters. In addition, as many as four DECdataway cables may be supported by a single host.

DECdataway Fiber Optic Extensions

The DECdataway network architecture, through the DYX02 DECdataway Optic Interface, supports point-to-point fiber optic branches as long as 2 kilometers (6,000 feet). System transparent, the DYX02 fiber optic branches provide the DECdataway user greater flexibility and efficiency in cabling large sites, EMI immunity in cabling near high voltage wires or equipment, inherent ground loop protection interbuilding or intersite, and generally faster and easier installation than by conventional cables permit. The fiber optic does not replace the DECdataway. A single DECdataway may support up to three pairs of optic links (one pair per DYX02) for a total of six branches; a host with four DECdataways could therefore support as many as 24 optic branches.

DECdataway Product Overview

DECdataway systems support remote intelligent subsystems (DYS50s) that serve as front-end devices within the local area network. These subsystems consist of an industrial box containing a PDP-11/23-PLUS microcomputer, 256-Kbyte RAM memory, and a communications interface. It is both 48-centimeter (19-inch) rackmountable and NEMA type 12 mountable.

In addition, a microprocessor-based DECdataway serial interface is available to serve as an EIA or a 20-mA serial I/O port. Acting as a data preprocessor, it provides an error-free, block-mode DMA interface between a character-oriented device and a DECdataway host.

DECdataway system host computers function as masters for the DECdataway system. Host computers share mass storage, data management facilities, realtime computing power, and interactive program development utilities with network devices. The DECdataway host can accommodate four DECdataway links and may operate independently or as a member of a CPU-to-CPU network. Host systems are based on PDP-11 or VAX-11 processors using layered DECdataway software that provides users with access and control of remote devices.

A DECdataway systems kit added to a UNIBUS PDP-11 or VAX-11 system creates a DECdataway system host. These kits contain host DECdataway software, two DECdataway controllers, DECdataway intelligent subsystems (DIS) network utilities, and a diagnostic package. DIS utilities create a task-to-task networking environment whose features include multiple logical links, segmented transfers, downline loading of RSX-11S system image, upline system dumping, and network status display.

DECdataway and Multipoint DECnet

The DECdataway complements DECnet and fills a void not addressed by DECnet. The DECdataway is a local area network optimized for use in harsh industrial environments for communication between a host system and its dependent subsystems and/or terminal devices. Multipoint DECnet is a local area network suited to the office environment for communication between computer systems.

The following features position the DECdataway as a specialized, industrial local area network:

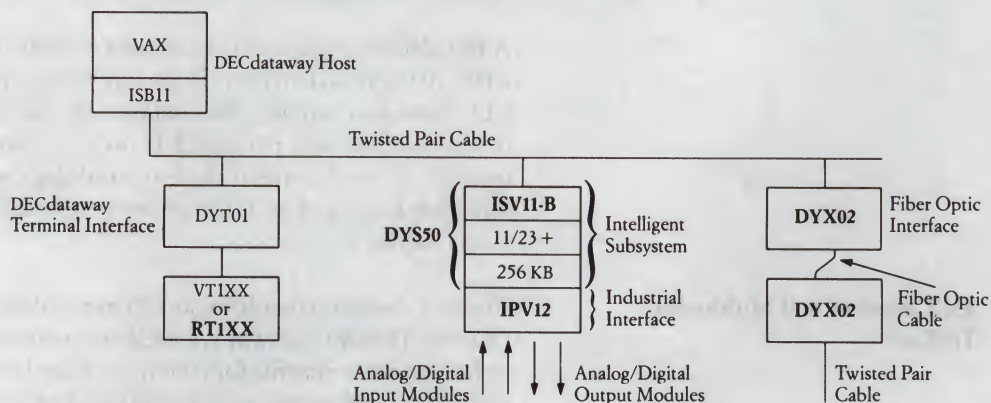
- Designed and tested to operate efficiently in industrial environments. DECdataway interfaces have been designed and tested for extremes of temperature and humidity and also for extremes of electrical noise.
- Downline-loadable diagnostics. DECdataway remotes do not require console terminal or diagnostic load devices. The diagnostic utilities provide a means to diagnose the network and attached devices separately or as a system.
- Automatic reboot of DECdataway intelligent subsystems. Upon recovery from a power failure, a DECdataway remote may be automatically rebooted by the host, supporting unattended operation.
- Industrial packaging. DECdataway remotes are readily mountable in industrial enclosures and environments.
- Remote application terminal support. DECdataway hosts support a serial interface that provides a means of directly multidropping terminals and other ASCII devices widely distributed throughout a facility.

DECdataway and Industrial I/O Product Options

The following pages in this section provide product descriptions and configuration information for the DECdataway and I/O subsystem family. These products serve as the key to the monitoring and supervisory levels within the industrial environment.

DECdataway Local Area Network System Software Kits

DECdataway layered software system kits result in a DECdataway host when added to a supported VAX-11 or PDP-11 system. Contains two ISB11-A controllers, DPMXX-A DECdataway connectors and tools, DECdataway test cable, 90-day hardware warranty, DECdataway software for VAX/VMS, RSX-11S single-use license and media, DECdataway software single-use license, DECdataway diagnostics, and documentation for hardware and software.



Host System	Option Number	Distribution Media	System Software
PDP-11/44	DPM2N-AM	Magtape (9-tr, 1600 b/in)	RSX-11M-PLUS
PDP-11/44	DPM2M-AD	Magtape (9-tr, 800 b/in)	RSX-11M
PDP-11/44	DPM2M-AH	Cartridge Disk (RL02)	RSX-11M
PDP-11/44	DPM2M-AM	Magtape (9-tr, 1600 b/in)	RSX-11M

License-only kits without binaries, documentation or support services.

Host System	Option Number	Distribution Media	System Software
PDP-11/44	DPM2N-DM	Magtape (9-tr, 1600 b/in)	RSX-11M-PLUS
PDP-11/44	DPM2M-DD	Magtape (9-tr, 800 b/in)	RSX-11M
PDP-11/44	DPM2M-DH	Cartridge Disk (RL02)	RSX-11M
PDP-11/44	DPM2M-DM	Magtape (9-tr, 1600 b/in)	RSX-11M

* Media designator refers to the diagnostics distributed with the system.

Host System	Option Number	Distribution Media	System Software
VAX-11/780	DYK2E-AM	Magtape (9-tr, 1600 b/in)	VAX/VMS
VAX-11/750	DYK2D-AM	Magtape (9-tr, 1600 b/in)	VAX/VMS
VAX-11/730	DYK2C-AM	Magtape (9-tr, 1600 b/in)	VAX/VMS

License-only kits without binaries, documentation or support services.

Host System	Option Number	Distribution Media	System Software
VAX-11/780	DYK2E-DZ*	Magtape (9-tr, 1600 b/in)	VAX/VMS
VAX-11/750	DYK2D-DZ*	Magtape (9-tr, 1600 b/in)	VAX/VMS
VAX-11/730	DYK2C-DZ*	Magtape (9-tr, 1600 b/in)	VAX/VMS

*Media designator refers to the diagnostics distributed with the system.



DECdataway Optical Interface

The DYX02-A is an active signal converter and repeater that allows fiber optic branches in DECdataway industrial local area networks. The DYX02 converts electrical DECdataway signals to photons, and photons to electrical DECdataway signals. It has both a POWER and an ACTIVITY indicator light that show operating condition. There are no controls, switches, or any requirement for user attention during operation. The DYX02 requires one DECdataway port connector; implementation is system transparent. It does not require a DECdataway address or program development/system generation to be placed in a DECdataway network.

- Dimensions: H 25.4 cm (10 in), W 27.9 cm (11 in), D 20.3 cm (8 in)
- Weight: 4.2 kg (10 lb)
- Environment: +0° to +60°C, 0% to 95% relative humidity, noncondensing
- Mounting: Wall or tabletop
- Indicators: POWER LED—DYX02 plugged into ac power source, power supply voltage present ACTIVITY LED—Online, optic signal activity
- Power: 120 Vac/240 Vac (selectable), 50-60 nominal ± 1 Hz
- Light Input: Minimum acceptable light intensity at a receiver 600 nw
- Fiber Optic Termination: AMP optimate connectors (customer-installed)

DECdataway Optical Interface Order Codes

Option	Order Code
DECdataway signal converter and repeater	DYX02-A

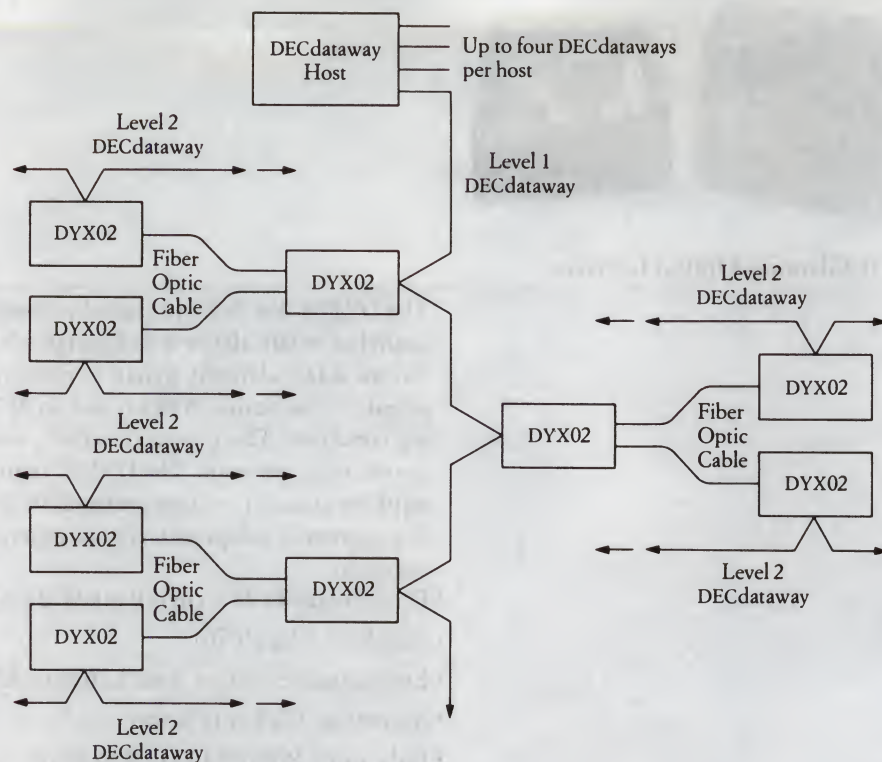
DYX02 Configuration

A DECdataway optic branch is a point-to-point link up that can extend 2 kilometers (6,000 feet). It requires a minimum of two DYX02s, one at each end. The first DYX02 connects to the Level 1 DECdataway, the electrical DECdataway cable that is connected to the DECdataway host. The second DYX02 connects to a Level 2 electrical DECdataway from which DECdataway devices (DYS50, DYT01) are multidropped. The Level 2 DECdataway may be 3 kilometers long.

A single DECdataway can support three pairs of optic links for a total of six optic branches; a host with four DECdataways could therefore support 24 optic branches.

CONFIGURATION

DIAGRAM—Maximum for One DECdataway



Configuration Rules

- Level 1 DECdataway must be ≤ 4.5 km (15,000 ft).
- Three Level 1 DYX02 taps per Level 1 DECdataway.
- Distance from host to Level 1 DYX02s must be ≥ 3 m (10 ft) and ≤ 3 km (10,000 ft).
- Each Level 1 DYX02 supports one or two optic links.
- Each optic link must be ≥ 25 m (77 ft) and ≤ 2 km (6,600 ft).
- Each Level 2 DECdataway must be ≤ 3 km (10,000 ft).
- The total electrical DECdataway length between the host and any Level 2 DECdataway device must not exceed 4.5 km or 15,000 ft (excludes optic link).
- Both Level 1 and Level 2 DECdataways must be properly grounded and terminated.



DECdataway Serial Interface

The DYT01 is an asynchronous EIA single-line interface to the DECdataway, allowing the location of standard hardcopy and video terminals throughout a manufacturing facility up to a distance of 3 miles from the host.

As a data preprocessor, the DYT01 provides a block mode DMA channel between a character-oriented remote device and a message-oriented task in the DECdataway host. Serial ASCII devices with which it can interface include programmable and numerical controllers, intelligent instruments and test equipment, and bar code readers.

The DYT01 is dynamically configured through a set of attributes (such as baud rate, character length, and buffer size) defined at the host and automatically downline-loaded whenever the device comes on-line. The DYT01 requires one DECdataway port connector. The DYT01 is exempt from FCC requirements because it was designed to be part of an industrial local area network (ILAN).

Note: The DECdataway installation kit DPMXX-A, -B may be ordered separately and contains parts and tools (excluding wire) necessary to build two DECdataway controller connectors and twenty port connectors.

Specifications

- Dimensions: H 25.4 cm (10 in), W 27.9 cm (11 in), D 20.32 cm (8 in)
- Weight: 4.2 kg (10 lb)
- Environmental: +5° to +50°C; 10% to 95% relative humidity, noncondensing
- Mounting: Wall or tabletop
- Power: 120 Vac/240 Vac (selectable), 50-60 Hz nominal \pm 1 Hz
- Input Current: 0.4 A nominal at 120 Vac; 0.2 A nominal at 240 Vac

Serial Interface Order Codes

Option	Order Code
Asynchronous EIA single-line interface	DYT01-EA
20 mA version.	DYT01-MA

DECdataway Intelligent Subsystems

User-programmable Q22, extended LSI-11 bus DECdataway intelligent subsystem. It is 48.3 centimeter (19 inch) rackmountable or NEMA type 12 cabinet mountable. It provides front access to installed Q22 bus options. Multidrop communications support is provided over the DECdataway via ISV11-C DECdataway remote interface. The DYS50 runs under the RSX-11S operating system on the DECdataway and is packaged in box-only or cabinet-mounted versions. The DYS50 subsystem requires two logical DECdataway addresses—one for transmitting and one for receiving—but requires only one DECdataway port connector. In combination with IPV12, DYS50 becomes a powerful industrial I/O subsystem distributed via DECdataway.

Features

The DYS50 DECdataway Subsystem includes

- PDP-11/23-PLUS (KDF11-BB) CPU with two serial lines
- Microcoded single- and double-precision floating point (KEF11-AA)
- 256 Kbyte Q22 Extended LSI-11 MOS parity memory (MSV11-PK)
- ISV11-C DECdataway communications interface
- BA11-YA 26.6 cm (10.5 in) high, 48.3 cm (19 in) wide, 29.2 cm (11.5 in) deep, 9-slot Q22 CPU box
- DPM remote software license (QJ658-DZ)
- Cabinetry: DYS50 cabinet-mounted versions are packaged in 154.2 cm (60 in) high H9646-AD cabinets or 182.9 cm (72 in) H960-CB cabinets. DYS50 box-only versions may be mounted in 48.3 cm (19 in) wide racks or NEMA industrial enclosures.

Intelligent Subsystem Order Codes

Option	Order Code
DYS50 box version with DPM Remote software license only, 120 V/240 V CPU Expansion: 5 Extended LSI-11 quad slots.	DYS50-D
DYS50-D installed in H960 182.9-centimeter (72-inch) high cabinet with IPV12 I/O subsystem, H332 screw terminal chassis and H349 system distribution panel. CPU Expansion: four extended LSI-11 quad slots.	DYS50-DB
DYS50-D installed in H9646 152.4-centimeter (60-inch) high cabinet with IPV12 I/O subsystem, H332 screw terminal chassis and H349 system distribution panel. CPU Expansion: four extended LSI-11 quad slots.	DYS50-DD

Prerequisite: RSX-11S or PDP-11 Operating System General license.

Cabinet Expansion: H9646 and H960 cabinets utilized by DYS50 cabinet-mounted versions provide vertical front mounting space for one DYS50 box and the IPV12 I/O subsystem. Caution: To maintain stability of cabinet-mounted DYS50 systems in operating and service positions, they must be installed as follows: an H960 mounted DYS50 must be secured to an adjacent H960 cabinet using an H950-G expander kit; an H9646 mounted DYS50 must be fitted with either an H9544-MJ stability kit or secured to an adjacent cabinet using an H9544-J expander kit.

Subsystem Memory Expansion: The DYS50 subsystem comes with 256 Kbyte of MOS parity memory installed and can be expanded to support 4 Mbytes.

Subsystem I/O Expansion: THE DYS50 box provides six extended quad slots for expansion. One IPV12 I/O subsystem, accommodating ten industrial I/O modules, may also be added to the DYS50. The IPV12 I/O subsystem may be expanded with seven additional H334 expander chassis—each chassis accommodating 10 modules—for a total of 80 I/O module slots.

Option Mounting Requirements

Model	Expansion Space	DC Amps Available		AC Amps Drawn	Bus Loads Available
		@ +5V	-12V	@ 120V	
DYS50-D	5 Extended LSI-11 Quad Slots	26.4	3.9	N/A	17

The diagram shows the location of modules in the backplane within the CPU box while areas labeled extended LSI-11 quad slot indicate available expansion space.

CPU BOX

A

B

C

D

OPTION	DC POWER				BUS LOADS	
	@+5V		@+12V			
	USED	AVAIL-ABLE	USED	AVAIL-ABLE	USED	AVAIL-ABLE
		26.4		3.9		17
11/23-PLUS CPU W/KEF11-AA						
256 KB PARITY MOS MEMORY (MSV11-PK)						
ISV11-B DECdataway INTERFACE (MOTHER BOARD)						
EXTENDED LSI-11 QUAD SLOT						
EXTENDED LSI-11 QUAD SLOT						
EXTENDED LSI-11 QUAD SLOT						
EXTENDED LSI-11 QUAD SLOT						
EXTENDED LSI-11 QUAD SLOT						
ISV11-B DECdataway INTERFACE (DAUGHTER BOARD)						

CARRY TO NEXT BOX ▶

DYS50 DECdataway Subsystem Options

The following options may be added to the DYS50 subsystem:

- DLV11-FB asynchronous EIA line interface
- DZV11-C asynchronous four-line multiplexer, EIA terminals or modems
- FPF11 floating processor
- H349 multifunction 26.5 cm (10.5 in) system distribution panel—included in DYS50-DX cabinet versions
- IPV12 PDP-11 Q-bus industrial I/O subsystem, IP I/O hardware options and modules—IPV12 included in DYS50-DX cabinet versions
- RXV21 double-density dual floppy disk subsystem—as a local boot device only
- TU58-EB tabletop dual drive cartridge tape subsystem—as a portable local boot device only

The IP I/O Subsystem Family

Digital's family of IP I/O subsystems is designed to handle applications that range from simple monitoring functions to the control of complex closed-loop systems. Built on a common architecture, I/O subsystems support a family of digital and analog interface modules. Each I/O subsystem is a cabinet or rackmountable unit consisting of I/O interface modules and a master chassis that provides mounting space and power. These subsystems interface with Digital's LSI-11 or PDP-11 computer systems and offer the capacity for handling more than 2,000 I/O points plus associated field-wired terminals. An I/O subsystem and associated CPU can be connected to the DECdataway communications local area network or can function as a remote device accessed through public or private lines.

IP I/O Subsystems

Product Information

The IP112 I/O subsystem is designed for local monitoring or control applications. It functions as a local peripheral to a UNIBUS PDP-11. A maximum of four IP112 subsystems can be connected to a single CPU. The IPV12 local I/O subsystem, similar to the IP112, interfaces to Q-bus PDP-11s—including the DECdataway intelligent subsystems.

Complementing these two local I/O subsystems is a series of digital and analog I/O modules that interface between field signals and the processor. Featuring CMOS logic to provide noise immunity, convection cooling to withstand harsh temperatures, and address switches to permit mounting in any I/O subsystem slot, Digital's I/O modules provide a wide range of functionality for the plant environment.

Option	Order Code
Industrial subsystems for local I/O monitoring and control by a UNIBUS PDP-11 host computer. Interfaces directly to the UNIBUS via software interface and operates under PDP-11 control. The IP112 subsystem supports as many as 2,023 I/O points and a total of ten subsystems can be connected to a UNIBUS-based PDP-11 system. The IP112 mounts in either a 48.3-centimeter (19-inch) rack or H960 cabinet and includes an H334 I/O subsystem chassis, power supply, an I/O control module (IOCM), and module expansion space. A driver and FORTRAN interface compatible with ISA61.1 are supplied as a part of the RSX-11 operating systems.	IP112-AD
The PDP-11 Q-bus version of the IP112 I/O subsystem. Provides local I/O monitoring and control by any standard LSI-11 based system (PDP-11/23-PLUS, PDP-11/23, or DYS50) in stand-alone mode or as part of a communications network. The IPV12 consists of an H334 chassis with power supply, an I/O control module (IOCM) to interface to the LSI-11 and extended LSI-11 bus, and mounting space for ten I/O modules.	IPV12-AD

Dimensions: 40 centimeters (15.5 inches) × 48.3 centimeters (19 inches) × 27.2 centimeters (10.69 inches).

Mounting: Mountable in H960 and H9646 cabinet or NEMA enclosures.

Both IP112, and IPV12 tasking may be programmed in MACRO-11, FORTRAN-IV or FORTRAN-77 operating under RSX-11M-PLUS, RSX-11M or RSX-11S.

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 15V	-15V	
IP112	1 Quad Slot LG Distribution Panel	1.5	0.15	0.0	1.0

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 12V		
IPV12	1 Quad Slot LG Distribution Panel	0.9	0.2		1.0

IP I/O Subsystem Hardware Options

Expansion Chassis and Power Supply

An I/O expansion chassis and power supply extends the D-BUS beyond a fully configured IP112, IPV12, or DYS50 master chassis. Each can accommodate ten I/O modules. There are no power restrictions that limit the mix of I/O modules in the chassis, with the exception of A631 D/A converters in current mode. The D-BUS is etched in the lower half of the H334 chassis backplane, which also includes cable connectors for extending the D-BUS between multiple chassis. A maximum of seven H334 expansion chassis may be interconnected to a single master chassis.

Expansion Chassis Order Codes

Option	Order Code			
I/O Expansion chassis and power supply.				
<i>Dimensions:</i> 40 centimeters (15.75 inches) × 48.3 centimeters (19 inches) × 27.2 centimeters (10.69 inches).				
<i>Mounting:</i> Front- and rear-mountable in H960 and H9646 cabinet or in NEMA enclosures.				H334-J
Empty-slot continuity (jumper) module for H334 I/O expansion chassis.				M9019

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 15V	-15V	
H334	LG Distribution Panel	0.0	0.0	4.0	N/A
H332	LG Distribution Panel	N/A	N/A	N/A	N/A

Screw Terminal

Screw Terminal Order Codes

Option	Order Code
A screw terminal mounting chassis that mounts in a H960 or H9646 cabinet or NEMA enclosure and holds the BC40 screw terminal assemblies leading to each of the I/O modules. Each chassis accommodates ten BC40 screw terminal assemblies.	
<i>Dimensions:</i> 40 centimeters (15.75 inches) × 48.3 centimeters (19 in) × 27.2 centimeters (10.69 inches).	
<i>Mounting:</i> Front- and rear-mountable in H960 and H9646 cabinets or in NEMA enclosures.	H332

Thermocouple temperature reference panels provide accurate reference (cold junction) compensation for a maximum of 16 two-wire thermocouple inputs to the A157 multiplexer, or A020 A/D converter. The unit consists of an isothermal screw terminal assembly that accepts 16 thermocouple inputs from the field; the signals are connected to the A157 (used in conjunction with the A014) or A020 input channels by a ten-foot plug-in cable. A high-level voltage is provided by a solid-state transducer mounted within the ATR16. The module does not require user-supplied power supply.

Reference Panel Order Code

Option	Order Code
Thermocouple temperature reference panel. <i>Dimensions:</i> 13.3 centimeters (5.25 inches) × 48.3 centimeters (19 inches) × 11.4 centimeters (4.5 inches). <i>Prerequisites:</i> An A020 A/D converter or an A167 multiplexer must be ordered separately for each ATR16. The A157 multiplexer requires an A014 A/D converter as a prerequisite. <i>Note:</i> The ATR16 mounts in a 48.3-centimeter (19-inch) rack in a cabinet, in a NEMA enclosure, or directly against a wall. The ATR16 does not mount in an H332 or H334 chassis, and it does not require a BC40 screw terminal strip.	ATR16

Screw Terminal Assemblies

Screw terminal strip assemblies connect the user's I/O lines to the I/O modules via screw strips. Each assembly consists of a 34 screw terminal barrier strip and an I/O cable connector mounted on a printed circuit board. The assemblies mount in the H332 screw terminal chassis, one for each I/O module, and connect to them by preassembled cables supplied with the screw terminal assemblies.

Screw Terminal Strip Order Codes

Option	Order Code
Screw terminal strip and 14-inch cable for 16-bit and 32-bit modules (excludes M5013, M6012, and M6013 modules). Mounts in a H332 screw terminal chassis directly above or below a corresponding I/O subsystem master chassis or H334 I/O expansion chassis.	BC40A
BC40A with 40-inch cable that mounts in an H332 screw terminal chassis back-to-back with a corresponding I/O subsystem master chassis or H334 I/O expansion chassis.	BC40A-3D
Screw terminal strip and 14-inch cable for 8-bit modules (i.e., M5013, M6012, and M6013 modules). Mounts in a H332 screw terminal chassis directly above or below a corresponding I/O subsystem master chassis or H334 I/O expansion chassis.	BC40B
BC40B with 40-inch cable that mounts in an H332 screw terminal chassis back-to-back with a corresponding I/O subsystem master chassis or H334 I/O expansion chassis.	BC40B-3D
Screw terminal strip and 14-inch cable with attached printed circuit board used in place of BC40A cable for mounting customer-supplied signal conditioning components such as filters, RTD bridges, and high voltage clamps.	BC40L
BC40L with 40-inch cable used in place of BC40A-3D cable that mounts in an H332 screw terminal chassis back-to-back with a corresponding I/O subsystem master chassis or H334 I/O expansion chassis.	BC40L-3D

Ordering Information

Digital Input Modules

Input Module Order Codes	Option	Order Code
	<p>A 32-bit nonisolated dc input module. For monitoring a wide range of voltages or contact closures. No external power source is required when monitoring contact closures. Accepts 32 single-ended inputs, structured as four 8-bit bytes, and sends them under program control to the processor. M5010 module features address selection and input protection. All field signals pass through a conditioning network that enhances signal integrity.</p> <p><i>Note:</i> Not suitable where common mode voltages exist between field circuits and mounting chassis.</p> <p><i>Field Termination:</i> One-wire input terminals and single field common terminal.</p> <p><i>Input Voltage:</i> -30 V to +55 V.</p> <p><i>Input Current:</i> 0.73 mA max. at +10 V, 2.7 mA max. at -30 V, 50 μA max. at +55 V.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5010
	<p>A 16-bit, nonisolated dc interrupt module. Accepts 16 single-ended, nonisolated inputs and provides change-of-state detection. The module interrupts on transition of any of the inputs and stores all transitions until cleared. The M5011 accepts a wide range of input voltages, features high input impedance, and operates at high speeds.</p> <p><i>Note:</i> Not suitable where common mode voltages exist between field circuits and mounting chassis.</p> <p><i>Field Termination:</i> One-wire input terminals and single field common terminal.</p> <p><i>Input Voltage:</i> -30 V to +55 V.</p> <p><i>Input Current:</i> 0.73 mA max. at +10 V, 2.7 mA max. at -30 V, 50 μA max. at +55 V.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5011
	<p>A 16-bit isolated dc input module. For monitoring voltages where noise immunity or common mode rejection is important. Accepts 16 differential inputs (all optically isolated), structured as two 8-bit inputs, and sends them under program control to the D-Bus. Interrupt capability is on a per-byte basis. Additional features include address and interrupt enable switches and individual input LED indicators.</p> <p><i>Field Termination:</i> Two-wire input terminals</p> <p><i>Input Voltage:</i> -55 V to +55 V.</p> <p><i>Input Current:</i> 2.55 mA typ. at +12 V, 20.1 mA max. at +55 V, 50 μA max. at -12 V.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5012

Option	Order Code
<p>A 16-bit isolated dc input module (TTL Compatible). Isolated 16-input dc voltage sense module with TTL-compatible logic thresholds. Accepts 16 differential inputs.</p> <p><i>Field Termination:</i> Two-wire field input terminals.</p> <p><i>Input Voltage:</i> -55 V to +55 V.</p> <p><i>Input Current:</i> 3.2 mA (2 TTL unit loads) at +5 V supply.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5012-YA
<p>An 8-bit isolated ac input module. For monitoring ac voltage levels. Transformer isolated, it accepts eight differential inputs inputs and monitors their states. Input is structured as a single 8-bit byte. The M5013 includes a switch-selectable change of state capability.</p> <p><i>Field Termination:</i> Three-wire input terminal (line, switch, neutral) with line and neutral common.</p> <p><i>Input Voltage:</i> ON = 90-140 Vac at 47-63 Hz; OFF = 0-30 Vac at 47-63 Hz.</p> <p><i>Input Current:</i> 25 mA max. at 140 V.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5013
<p>A 16-channel isolated dc interrupt module. Used for monitoring a wide range of voltages or contact closures. Accepts 16 differential inputs. The M5031 module offers a change-of-state initiated interrupt capability through enable switches for each of the 16 inputs. Features high input impedance and operates at high speeds.</p> <p><i>Field Termination:</i> Two-wire field input terminals.</p> <p><i>Input Voltage:</i> -55 V to +55 V max.</p> <p><i>Input Current:</i> 3 mA typ. at +12 V, 20.5 mA max. at +55 V, 50 μA max. -55 V.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M5031

Digital Output Modules

Output Module Order Codes

Option	Order Code
<p>A 32-bit nonisolated dc output module. Provides 32 program-controlled current sink dc outputs for use with an external power supply. The outputs are single-wire, non-isolated, open collector Darlington switches used for controlling relays, solenoid valves, indicators, heaters, and other devices. The outputs provide CMOS logic levels and feature a common output fuse. Also features Zener diode output protection from excessive supply voltages.</p> <p><i>Field Termination:</i> One-wire field output terminals and single field common terminal.</p> <p><i>External Field Supply Voltage:</i> 55 V max. <i>Low Voltage Output:</i> 1.4 V max.</p> <p><i>Maximum Sink Current:</i> 250 mA per point</p> <p><i>Mounting Code:</i> D-Bus Quad slot</p>	M6010

Option	Order Code
<p>32-bit non-isolated dc output module (TTL compatible). Provides 32 TTL compatible, program-controlled dc sink outputs that are single-wire, non-isolated, open collector switches for use with customer-supplied field power supplies and pull-up resistors. Protection against excessive field supply voltages is provided by Zener diodes across each output.</p> <p><i>Field Termination:</i> One-wire field output terminals and single field common terminal.</p> <p><i>External Field Supply Voltage:</i> 55 V max. for non-TTL loads, 5 V max. for TTL loads.</p> <p><i>Low Voltage Output:</i> 0.4 V max.</p> <p><i>Maximum Sink Current:</i> 64 mA per point (40 TTL unit loads).</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	M6010-YA
<p>Nonisolated dc one-shot output module. Provides 16-program controlled current sink dc outputs for use with an external field power supply. Outputs are nonisolated, single-wire, one-shot, open collector Darlington switches used for operating devices that must be activated for only a short duration (i.e., solenoid valves and relays). The outputs provide CMOS logic levels for noise immunity and reliability. Also features Zener diode output protection from excessive field voltage overloads.</p> <p><i>Field Termination:</i> One-wire field output terminals and single-field wire field common return.</p> <p><i>External Field Supply Voltage:</i> +55 V max.</p> <p><i>Low Voltage Output:</i> 1.4V max.</p> <p><i>Maximum Sink Current:</i> 250 mA per point.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M6011
<p>An 8-bit isolated dc output module. Provides eight program-controlled current sink outputs for use with an external power supply. Outputs are isolated, three-wire, open collector Darlington switches used for controlling solenoid valves, relays, indicators and heaters, where isolation from the controlled process must be maintained. The outputs provide CMOS logic levels and feature individual output indicators.</p> <p><i>Field Termination:</i> Three terminals (+, -, switch), with internal connection between all plus and minus terminals.</p> <p><i>External Field Supply Voltage:</i> +55 V max., +10 V min.</p> <p><i>Low Voltage Output:</i> 1.8 V max.</p> <p><i>Maximum Sink Current:</i> 1 A per point, 4 A per module.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	M6012
<p>An 8-bit isolated ac output module. Provides eight program-controlled ac outputs. Outputs are transformer-isolated, three-wire switches used for switching ac line voltages to operate ac relays, solenoids, lamps, pumps, blowers, alarms, etc. Features include individual output status indicator and fuse protection for the circuit board etch.</p> <p><i>Field Termination:</i> Three-wire input terminal (line, switch, neutral) with line and neutral common.</p> <p><i>Output Line Voltage:</i> 120-240 Vac at 47-63 Hz.</p> <p><i>Output Current:</i> 38 mA min., 2 A max. per point, 8 A max. per module.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M6013

Option	Order Code
<p>A 16-bit retentive dc output module. Provides 16 program-controlled retentive dc outputs for use with external power supplies. Outputs are isolated, three-wire, power FET switches that offer the same functionality in solid-state as latching-relay outputs, but with higher reliability. The M6015 module is used for controlling solenoid valves, relays, indicators, heaters and the like where retention of existing output status must be maintained during a computer power failure. Output circuits are optically isolated from the I/O subsystem and from each other in groups of four – each requires its own field power supply if there is a common-mode voltage between the group. The M6015 can also be used as an isolated DC output module, such as an M6012.</p> <p><i>Field Termination:</i> Three-wire input terminal (line, switch, neutral) with line and neutral common.</p> <p><i>External Field Supply Voltage:</i> +55 V max., +12 V min.</p> <p><i>Low Voltage Output:</i> 2 V max.</p> <p><i>Maximum Sink Current:</i> 250 mA max. per point.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus Quad slot.</p>	M6015

Analog Modules

Note: Digital does not recommend locating analog input modules within three D-Bus slots of any digital I/O module that is switching high voltages or current, due to the potential for induced noise on the analog measurements.

Analog/Digital Converters

A/D Converter Order Codes

Option	Order Code
<p>An isolated high common mode A/D converter. 14-bits plus sign, selectable gain, wide-range analog-to-digital converter. Provides high common mode isolation using a mercury-wetted relay multiplexer for its 16 two-wire, or eight three-wire field inputs. The A020 has 14 full-scale input ranges. Via a switch, you can select a single range for all channels, or you may select two ranges and have one set of consecutive channels operate on one range and the remainder on the second. Features include a very high common mode rejection, voltage input protection. It also supports the ATR16 Thermocouple Temperature Reference Panel for applications requiring thermocouple sensing.</p> <p><i>Resolution:</i> 14 bits plus sign.</p> <p><i>Throughput:</i> 37 conversions per second at 60 Hz and 31 conversions per second at 50 Hz, scanning or same channel.</p> <p><i>Input Voltage:</i> Fourteen switch-selectable, full-scale input ranges (± 50 V to ± 10 microvolts).</p> <p><i>Common Mode Voltage Isolation:</i> Maximum of ± 500 V peak between channels and between ground and channel.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	A020

Option	Order Code
<p>Solid-state A/D converter. A high-speed converter with 16 single-ended or differential input channels, the A014 module provides successive approximation A/D conversion of high-speed input signals and supports a maximum of seven external multiplexer boards (A156, A157, or AM158) in any combination. When used with multiplexers, the A014 can also accommodate 240 single-ended or 120 differential inputs. Features include over-voltage protection.</p> <p><i>Note:</i> A156, A157, and AM158 multiplexers must be mounted contiguously to their corresponding A014 A/D converter in the same master or H334 expansion chassis.</p> <p><i>Resolution:</i> 12 bits bipolar.</p> <p><i>Hardware Conversion:</i> 64 μs max. (scanning or single-channel).</p> <p><i>Input Voltage:</i> -10.24 V to +10.24 V.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	A014

Analog Multiplexers

Multiplexer Order Codes

Option	Order Code
<p>High-level analog multiplexer. Multiplexer module that provides additional input channels to the A014 A/D converter. Each module features 32 single-ended or 16 differential channels of analog inputs. Seven A156 modules that provide up to 224 additional single-ended or 112 differential input channels can be added to the A014. Features include input protection and switches for selecting single-ended/differential mode and the number of multiplexers.</p> <p><i>Note:</i> A156, A157, and AM158 multiplexers must be mounted contiguously to their corresponding A014 A/D converter in the same master or H334 expansion chassis.</p> <p><i>Hardware Conversion:</i> 74 μs max. with A014.</p> <p><i>Input Voltage:</i> -10.24 V to +10.24 V.</p> <p><i>Signal Plus Common Mode Voltage:</i> ± 12 V max.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	A156
<p>Wide-range analog multiplexer. Multiplexer module that provides moderate speed multiplexing of high- and low-level analog input signals. The module accepts 16 differential inputs that can be independently programmed for any one of eight different gains. Seven A157 modules that provide 112 additional differential input channels can be supported by one A014. Features include voltage input protection and compatibility with ATR16 Thermocouple Temperature Reference Panel. Recommended for use with two-wire inputs, with common mode return path provided at the transducer end of the cable.</p> <p><i>Note:</i> A156, A157, and AM158 multiplexers must be mounted contiguously to their corresponding A014 A/D converter in the same master or H334 expansion chassis.</p> <p><i>Hardware Conversion:</i> 84 μs max. with A014.</p> <p><i>Input Voltage:</i> ± 10.24 mV to ± 10.24 V.</p> <p><i>Signal Plus Common Mode Voltage:</i> ± 12 V max.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	A157

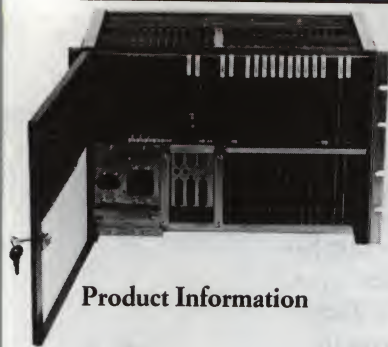
Option	Order Code
<p>RMS to dc multiplexer. Provides true RMS conversion of low-level (± 10 V) ac signals of either the sine wave type or any other periodical type (such as SCR-controlled signals). The AM158 is a 16 channel differential multiplexer that multiplexes the inputs as pairs, thereby enabling two RMS readings to be taken simultaneously.</p> <p><i>Note:</i> A156, A157, and AM158 multiplexers must be mounted contiguously to their corresponding A014 A/D converter in the same master or H334 expansion chassis.</p> <p><i>Hardware Conversion:</i> 250 to 400 μs with A014.</p> <p><i>Input Voltage:</i> -10.24 V to +10.24 V</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	AM158

Digital/Analog Converter

Converter Module Order Codes

Option	Order Code
<p>12-bit isolated, four-channel D/A converter. Contains four group-isolated, 12-bit digital-to-analog converters. The module is optically isolated, offers a choice of current or voltage outputs, and is capable of retaining its output states during a power failure.</p> <p><i>Note:</i> The user must provide external ± 24 V power to the A631 module to operate in the retentive mode.</p> <p>When the retentive feature is not implemented and the module is used in the current mode, the A631 should be configured in an IP112/IPV12 master chassis or H334E/J expander chassis as follows:</p> <p>If the entire chassis is to be filled with A631s, leave one slot unused; the remaining nine slots can then be filled with current-mode A631s. The unused slot should be filled with an M9019 continuity module unless it is the last slot in the subsystem.</p> <p>Or use five or fewer current-mode A631 modules per chassis; the remaining slots can be used for any other IP I/O module types, including voltage-mode A631s.</p> <p><i>Output Voltage:</i> 0 to 10.24 V at ± 5 mA.</p> <p><i>Output Current:</i> 0 to 20.48 mA, max. load 500 ohms.</p> <p><i>Common Mode Voltage Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	A631

Counter Module Order Codes	Option	Order Code
	<p>Dual input counter. Contains two independent 16-bit counters, each of which is a presetable up-counter with internally generated frequency and time bases. The inputs may be isolated or non-isolated, low-level or high-level, or TTL. Each counter has switches that allow the selection of alternate time bases, input configurations, counting modes, and interrupt modes. Each counter also has an anticoincidence circuit that prevents the loss of an input signal while it is being read.</p> <p><i>Maximum Input Voltage:</i> ± 55 V.</p> <p><i>Short-Term Overload:</i> 117 Vac for a maximum of 2 hours.</p> <p><i>Internal Frequency Base Range:</i> 100 kHz, 10 kHz, and 100 Hz $\pm 0.1\%$, switch-selectable for each counter.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	M5014
	<p>Quad input counter/prescaler. Contains four independent 8-bit up-counters designed for prescaling and event counting applications. Each counter has a variable radix overflow detection and overflow-driven interrupt circuitry. The module can also accept both high- and low-level inputs, and is capable of operation in isolated or nonisolated input modes.</p> <p><i>Maximum Input Voltage:</i> ± 55 V.</p> <p><i>Short-term Overload:</i> 117 Vac for as long as 2 hours.</p> <p><i>External Power Supply Voltage:</i> 12 to 28 V (low-level range), 25 to 55 V (high-level range).</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	M5016
	<p>Dual output counter. Dual 16-bit output pulse generator that contains two internal frequency sources (derived from the system clock), two independent program-controlled counters, and two one-shots for generation of pulse train outputs. The counters are arranged as 15-bit magnitude down-counters with one sign/direction bit. Each counter has three nonisolated dc current sink outputs that are TTL compatible as open collector drivers and are also usable as high-level drivers. Output pulse rates and pulse widths are independently selectable.</p> <p><i>Maximum Input Voltage:</i> 55 V.</p> <p><i>Short-term Overload:</i> 117 Vac for as many as 2 hours.</p> <p><i>External Power Supply Voltage:</i> 12 to 28 V (low-level range), 25 to 55 V (high-level range).</p> <p><i>Common Mode Isolation:</i> 500 V RMS.</p> <p><i>Mounting Code:</i> D-Bus quad slot.</p>	M6014



Product Information

CMR21

CMR21 is an industrial I/O processor that interfaces field analog and digital signals to VAX computers. It features extensive ROM-based firmware for field I/O, communications and maintenance operations, while also providing base level PDP-11 functionality for customer application software. The CMR21 can operate as a stand-alone device, or it can be configured in multidrop networks with VAX hosts.

The CMR21-Ax options consist of a processor, 16 Kbytes of memory, four serial communications ports, maintenance mode firmware, base mode firmware, and a power supply. The chassis provides space for 16 I/O modules, 16 connector cards, and one A/D converter module. The CMR21-Cx options have the same components as the CMR21-Ax plus a library of software utilities for use with host VAX systems. The CMR21 can be configured into a Digital cabinet, such as the H9642, or a customer-supplied, industrial-type cabinet.

The CMR21 option operates on full-duplex asynchronous communications and its interface can be EIA/CCITT serial line interface via modems or a null modem cable. External cables not included, BC22D is recommended.

Prerequisite Hardware: When connected to a VAX host, the CMR21 requires one EIA/CCITT terminal port such as provided by DMF32 or DZ11 interfaces. Appropriate modems are required when the CMR21 will be located remotely from the VAX host.

Prerequisite Software: Standard terminal drivers are used for communication between the customers applications software and the CMR21.

CMR21 Order Codes

Option	Order Code
CMR21 hardware.	CMR21-AB
CMR21 hardware plus library of software utilities.	CMR21-BB
CMR21 hardware. Can also operate at 12 Vdc.	CMR21-AD
CMR21 hardware plus library of software utilities. Can also operate at 12 Vdc	CMR21-BD

CMR11

CMR11 subsystems interface PDP-11 host computers to industrial and commercial equipment in widely distributed networks with medium to low-speed data I/O requirements. The CMR11 and CMV11 (LSI-11 version) systems consist of the host control module mounted in UNIBUS or LSI-11 computer system; a communications panel (CMR11-01) containing as many as four limited distance modems; CMR remote units located throughout the industrial environment; and CMR I/O modules contained within the remote units. Resident microprocessors in both host control module and remote units handle all the networking functions, thus enabling the host computer to perform application programs. CMR11 I/O subsystems are supported by RSX-11M, RSX-11M-PLUS and RSX-11S operating systems.

CMR11 Order Codes**Option****Order Code**

Host control module. Microprocessor-based host control module interfaces single or multiple remote industrial I/O units to a UNIBUS PDP-11 host computer. Four serial communication ports cable out to the CMR communications panel (CMR11-01) which is mountable in the host CPU. Each individual port can have its own switch-selectable baud rate from 300 to 9600. A four-port host control module can operate 64 remote units using limited distance modems or 252 units using EIA moded communications. Additional remote units can be added at any time. As many as 16 host control models can be supported by the RSX-11M, RSX-11M-PLUS or RSX-11S operating system.

CMR11-AA

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 15V	-15V	
CMR11-AA	1 Hex Slot	5.0	0.0	0.0	1.0

Host control module. LSI-11 version of the CMR11-AA.

Note: The CMV11-AA host controller consists of two dual-height modules (M7181 and M7182) that require three contiguous backplane slots. The M7181 module requires one LSI-11 double slot, while the dual-layered M7182 module requires two LSI-11 double slots.

CMV11-AA

Option Mounting Requirements

Option	Mounting Requirements	DC Amps Drawn @			Bus Loads Drawn
		+ 5V	+ 15V	-15V	
CMV11-AA	3 LSI-11 Double slots	5.0	0.0	0.0	1.0

Communications panel. Rackmountable communications panel on host computer. The CMR11-01 includes one limited distance modem (LDM), but has space for three additional LDMs (CMR11-02s) for a total of four. A 6-foot cable that connects the LDM to one of four CMR11 or CMV11 ports is also included. In addition, each LDM provides screw terminals and communication hardware for direct connection to two-wire or four-wire communications cables. As many as 16 CMR remote units can be connected to an LDM using a telephone line or communications cable. Networking to remote units outside a single location requires connection via leased voice-grade telephone lines. The LDM in the communications panel can accommodate dedicated lines or continuous dc metallic pairs and features selectable baud rate setting of 300, 600, 1200, 2400, 4800, and 9600. The CMR11-01 communications panel is a 19-inch, rackmountable unit measuring 26.7 centimeters (10.5 inches) high × 10.2 centimeters (4 inches) deep. *Note:* ± 5 Vdc power for LDM is obtained from CMR11 or CMV11 host controllers.

CMR11-01

Option	Order Code
LDM add-on kit. Consists of a limited distance modem (LDM) and cable for connection to the host controller communication port. CMR11-02 LDM kits may be ordered with the initial system or as a field add-on unit. Mounts in CMR11-01 communications panel and dedicated CMR11-01 slot. <i>Note:</i> ± 5 Vdc power for LDM is obtained from CMR11 or CMV11 host controllers.	CMR11-02
Remote Unit. Rack-/panel-mountable unit consisting of a pre-programmed microprocessor controller, an integral limited distance modem, ac or ac/dc power supply, a maintenance/display control panel, and CMR cardfile with mountingspace for as many as 16 I/O modules, and 16 slots available for paddleboard cable termination and signal conditioning components. The resident microprocessor receives, decodes, error-checks, and loads host messages into the correct I/O registers. In addition, the remote unit's microprocessor identifies the type and function of all I/O modules and maintains a map of their current configuration. The 48.3-centimeter (19-inch) rackmountable CMR01 remote unit is 30.5 centimeters \times 28 centimeters deep (12 inches \times 11 inches). <i>Note:</i> The CMR01 power supply provides CMR logic power only. Field sensor power must be separately supplied.	CMR01-AB
Remote unit. Identical to the CMR01-AB remote unit, but includes an additional 12 Vdc battery input facility. Upon power loss, the unit will revert to dc operation and, depending on the number of I/O modules installed, is capable of operating a minimum of 10 hours from a single 20 ampere-hour battery. The battery, and its charging unit must be customer supplied.	CMR01-AD

Note: Technical specifications for CMR01 I/O modules are listed under the CMR21. Except for the M8997 pulse counter (CMR01 uses M8997-00 pulse counter), all I/O modules are interchangeable between CMR01 and CMR21.

Ordering Information

Any combination of the following I/O modules may be configured in a CMR to a maximum of 16 modules (total).

Digital Input Module

Input Module Order Code	Option	Order Code
	<p>A 16-bit isolated dc input module for monitoring voltages where noise immunity and isolation are important. Accepts up to 16 differential inputs through optical isolators. LED status indicators are provided for each input point.</p> <p><i>Field Termination:</i> Two wire inputs via termination module.</p> <p><i>Input Voltage:</i> 5 V. Other inputs up to 48 Vdc are accommodated via series dropping resistors on the M9050 or M9052 termination modules.</p> <p><i>Input Current:</i> 3.5 mA at 5 V (min), 22 mA at 24 volts (max).</p> <p><i>Isolation:</i> 2 kV optically isolated.</p> <p><i>Filter:</i> 6-ms RC delay</p> <p><i>Mounting Code:</i> CMR RBus dual slot.</p>	M8993

Digital Output Modules

Output Module Order Codes	Option	Order Code
	<p>A 16-bit Form B (normally closed) mercury-wetted relay output module. Provides isolated contact enclosures to control external circuits. Outputs are controlled by a 16-bit register that can be written or read from the CMR processor. The state of each relay is indicated by an LED indicator. LEDS are on when the relay contacts are open. Relay contacts close when power is turned off to the CMR unit.</p> <p>Relay contact suppression circuits are customer installed on the M9050 or M9052 termination module.</p> <p><i>Field termination:</i> Two wires per point via termination module.</p> <p><i>Relay Type:</i> Mercury-wetted reed, Form B.</p> <p><i>Contact Rating:</i> 2 A max, 500 V max (dc or peak ac), 100 VA max.</p> <p><i>Operations:</i> 22 billion at full load.</p> <p><i>Operating Frequency:</i> 125 kHz.</p> <p><i>Isolation:</i> 1000 v RMS.</p> <p><i>Mounting Code:</i> CMR Rbus dual slot.</p>	M8986

Option	Order Code
<p>A 16-bit Form A (normally open) dry reed relay output module. Provides isolated contact closures to drive low-power external circuits. Outputs are controlled by a 16-bit register that can be written or read from the CMR processor.</p> <p>The state of each relay is indicated by an LED indicator that is illuminated when the relay is energized (closed). Relays open when CMR power is turned off.</p> <p>Relay contact suppression circuits are customer installed on the M9050 or M9052 termination module.</p> <p><i>Field Termination:</i> Two wires per point via termination module.</p> <p><i>Relay Type:</i> Dry reed, Form A.</p> <p><i>Contact Rating:</i> 0.75 A max, 200 V max (dc or peak ac), 10 VA.</p> <p><i>Operating Frequency:</i> 800 Hz.</p> <p><i>Operations:</i> 100 million at rated load.</p> <p><i>Isolation:</i> 350 Vdc or peak ac.</p> <p><i>Mounting Code:</i> CMR RBus dual slot.</p>	M8987
<p>A 16-bit Form A (normally open) mercury-wetted relay output module. Provides isolated contact closures to drive external circuits. Outputs are controlled by a 16-bit register that can be written or read from the CMR processor. The state of each relay is indicated by an LED indicator that is illuminated when the relay is closed. Relays open when CMR power is turned off.</p> <p>Relay contact suppression circuits are customer installed on the M9050 or M9052 termination module.</p> <p><i>Field Termination:</i> Two wires per point via termination module.</p> <p><i>Relay Type:</i> Mercury-wetted, Form A.</p> <p><i>Contact Rating:</i> 2A max, 500 V (dc or peak ac), 100 Vac.</p> <p><i>Operating Frequency:</i> 125 Hz.</p> <p><i>Operations:</i> 22 billion at full load</p> <p><i>Isolation:</i> 1000 V RMS.</p> <p><i>Mounting Code:</i> CMR RBus dual slot.</p>	M8994
<p>Four channel isolated pulse counter module. Contains four independent 16-bit counters for use in event counting applications. Each counter channel can be read, or reset to zero by the CMR processor. Each counter input is optically isolated and is provided with an LED that indicates when input pulses are present. Voltage dropping resistors, or filter circuits may be installed on the M9050 or M9052 termination modules to accommodate higher input voltages or to filter noisy signals.</p> <p><i>Field Termination:</i> Two wire inputs via termination module.</p> <p><i>Input Voltage:</i> 5 volts nominal.</p> <p><i>Input Current:</i> 3.5 mA at 5 V (min), 22 mA at 24 V (max).</p> <p><i>Isolation:</i> 2 kV optically isolated.</p> <p><i>Maximum Frequency:</i> 10 kHz.</p> <p><i>Maximum Pulse Width:</i> 50 μs.</p> <p><i>Mounting Code:</i> CMR RBus dual slot.</p>	M8997-YA

Input Module Order Codes	Option	Order Code
	<p>Isolated A/D converter, 12 bits plus sign, autoranging or four programmable gains. Dual slope integrating type for high common mode, and normal mode rejection. The A805 resides in a dedicated slot adjacent to the CMR processor, and requires one or more analog input multiplexers to bring signals into it. LED indicators show conversion in progress, and gain range selected.</p> <p><i>Field Termination:</i> Provided at A1004/A1005 multiplexers.</p> <p><i>Input Range:</i> +10 to -10 V differential.</p> <p><i>Resolution:</i> 12 bits plus sign and overrange.</p> <p><i>Common Mode Rejection:</i> 110 db, at 60 Hz with 1K source imbalance.</p> <p><i>Common Mode Isolation:</i> 300 V dc, 40V ac at 60 Hz.</p> <p><i>Gain Ranges:</i> 1, 10, 100, 1000 plus autoranging.</p> <p><i>Accuracy:</i> 0.05% of full range at gains of 1 and 10, 0.1% of full range gain of 100, 0.2% of full range at gain of 1,000.</p> <p><i>Mounting Code:</i> Dedicated CMR slot for A/D. Maximum one A805 per CMR chassis.</p>	A805
	<p>Eight-channel, two-wire analog input multiplexer module. Selects one of eight differential input to route to the A805 A/D converter. A maximum of 16 A1004 (or A1005) modules may be installed in a CMR to provide 128 analog input channels. Switching is performed with high quality reed relays. LED indicators show which channel is selected. Signal conditioning components such as resistors to convert 4-20 mA to 2-10 volts can be installed on the M9050 or M9052 termination modules.</p> <p><i>Field Termination:</i> Two wire differential inputs via termination module.</p> <p><i>Number of Channels:</i> 8.</p> <p><i>Relay Type:</i> Two-wire dry reed.</p> <p><i>Operations:</i> 10 million at rated levels.</p>	A1004
	<p>Eight-channel, three-wire analog input multiplexer. Identical to A1004 except that relays switch three lines (positive, negative, and guard) to the A/D converter.</p>	A1005

Analog Output Module

Output Module Order Code	Option	Order Code
	<p>Two-channel D/A converter module. Provides 4-20 mA output current to drive process control equipment. Outputs are controlled via 10 bit registers that can be written to, or read by the CMR processor. 1-5 volt or 2-10 volt outputs can be created using resistors installed on the M9050/M9052 termination modules. D/A output channels are referenced to system ground.</p> <p><i>Field Termination:</i> Two wires per channel via termination module.</p> <p><i>Output:</i> 4-20 mA into 500 Ω load (max).</p> <p><i>Resolution:</i> 10 bits.</p> <p><i>Channels:</i> 2.</p>	A6005

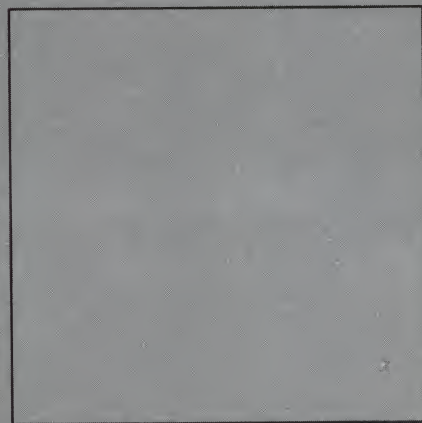
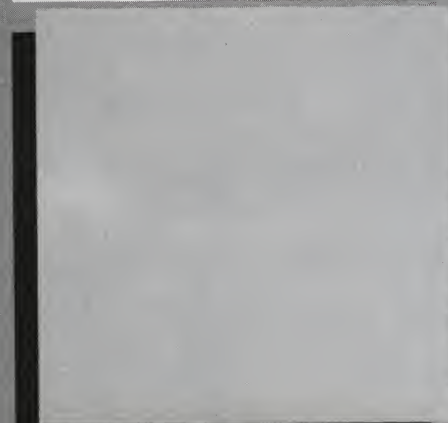
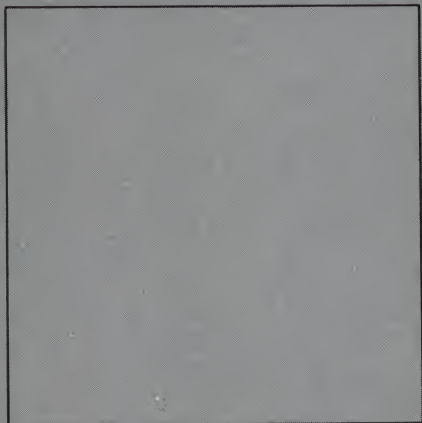
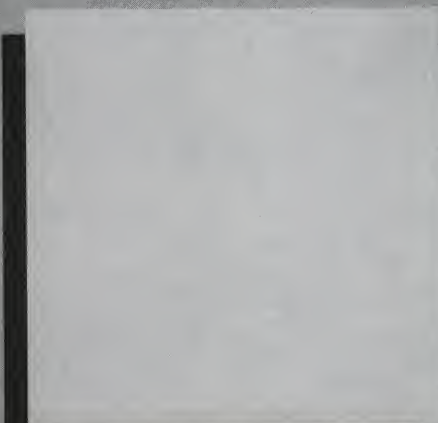
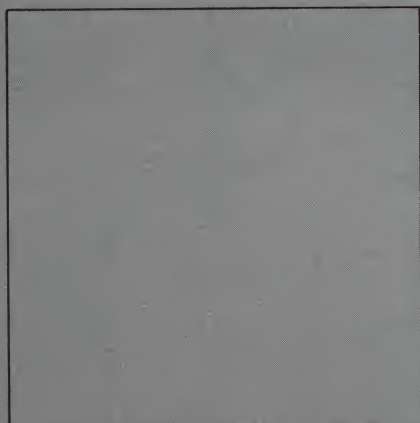
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M9052

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1. *Journal of the American Medical Association*, 273: 1033-1034, 1995.

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26



Software is the collection of written procedures and rules that control computer operations. The system software always includes an operating system, which is the “intelligence” of the computer system. Usually, the system software includes one or several language processors; it frequently includes specific applications as well.

As a set of organized programs, system software transforms your system hardware components into usable tools. These programs include operations, functions, and routines that assist you in solving problems and producing results. For example, some system programs store and retrieve data among the various peripheral devices. Others perform difficult or lengthy mathematical calculations. Some programs allow you to create, edit, and process application programs of your own. Still others handle entire applications for you.

Product Description

VAX/VMS is the general purpose operating system for VAX systems. It provides a rich development environment for a powerful family of high-level language processors commonly needed in engineering, scientific, commercial, instructional, and systems applications: VAX Ada[®], APL, BASIC, BLISS, C, COBOL, DIBOL, FORTRAN, LISP, PASCAL, PL/I, RPG, CORAL 66, and Macro. VAX/VMS provides the tools to write, compile, and link programs, as well as to build libraries of source, object, and image modules. User applications can employ more than one language, and the ability of languages to call one another allows concatenation of application modules written in a variety of languages, provided they satisfy certain criteria. These native-mode language processors produce object code and take advantage of the RICH VAX instruction set and 32-bit architecture of the VAX hardware. Once applications are developed, they can be transported and run on any member of the VAX family because VMS runs on all VAX processors. The extensive security features provided with VMS ensure a stable development environment by protecting systems and data.

VAX Common Language Environment

An important feature provided by the VAX architecture is a Common Language Environment; that is, the VAX languages adhere to a specific set of standards, including:

- Conformance to the VAX calling standard which allows programs written in any one of the VAX/VMS languages to call procedures written in the other native languages, as well as calls to VAX/VMS system services and to the callable system utilities.
- Use of VAX RMS by all of the VAX/VMS languages and utilities, for consistent record handling and file sharing support across multi-language applications.
- Use of VAX Sort/Merge allows the flexibility of four sorting techniques and merging data from up to ten input files. VAX SORT/MERGE supports user-defined collating sequences as well as the DEC multinational character set.
- Use of Common Runtime library as the integrated functional base for all of the VMS languages. The runtime library provides both language-dependent support procedures, as well as many language-independent utility and mathematic procedures.
- Common handling of exceptions, providing uniform error and event handling across the languages and the system utility procedures.
- Use of the symbolic traceback facility, facilitating consistent error diagnosis.
- Symbolic debugger interface for the VAX/VMS languages, ensuring the ability to debug applications composed of modules which are written in one or more of the languages.
- Common terminal forms management services, callable from the high level languages.

VAX Calling Standard

The VAX calling standard defines and supports the mechanisms for passing arguments between modules of major VAX software subsystems such as languages, VAX RMS, and the VAX/VMS operating system. It also defines the format for descriptors and various string data types. The standard facilitates the calling of a procedure written in one language from a program written in another language.

VAX RMS

VAX Record Management Services (RMS) is the service programmers use to handle record I/O within programs. VAX RMS routines that provide an efficient and flexible means of handling files and allowing sharing of files across languages and across multiple applications. All VAX languages do I/O through RMS, so files written by one application can be read and used by another application, even if it is written in a different language. VAX RMS supports:

- Multi-key Indexed File organizations
- Relative File organizations
- Sequential File organizations
- Stream File organizations
- Concurrent file access by VMS users
- Utilities to create, alter, delete and analyze files

High-level language programmers normally use the I/O statements of their particular language to perform record and file operations. These operations are implemented using the VAX RMS facilities.

VAX RMS routines are an integral part of the operating system. The programmer need not perform any special linking or declaring of global entry points for the routines. Furthermore, VAX RMS routines are consistent with the VAX calling standard.

Common Runtime Library

The VAX Common Runtime Library contains sets of general purpose and language-specific procedures. User programs call these procedures to perform specific tasks required for program execution. The high-level language programmers can use the Runtime Library procedures in any combination. The Runtime Library includes support for:

- Individual Language statement semantics
- Common Math Library procedures
- Common String Handling procedures
- Program-level resource allocation
- Common Virtual Memory management procedures
- Terminal-Independent screen management procedures
- Parsing procedures
- Cross-Reference construction procedures
- High-Level Interfaces to selected VMS System Services
- Data conversion procedures
- And other miscellaneous procedures

Because all procedures follow the same programming standards and make no conflicting execution assumptions, a language-independent runtime library encourages a user program to be composed of procedures written in different languages and, therefore, increases programming flexibility.

Exception Handling

The mechanisms defined by the VAX calling standard are also used by the common condition-handling facility to signal the occurrence of exceptions detected by hardware or software.

Symbolic Traceback Facility

VAX/VMS provides the Symbolic Traceback Facility. This is a runtime facility that aids programmers in finding errors by describing the procedure call sequences that occurred prior to an error. The traceback facility is automatic; it does not require that any special qualifiers be included with the compile or LINK commands, although it can be suppressed by specifying NOTRACE with the LINK command.

When a fatal error condition is detected, the error message is displayed by the runtime library to indicate the nature of the error and the address at which the error occurred. This is followed by traceback information that is presented in inverse order to the calls. For each call frame, traceback lists module name, routine name, source-program line, and absolute and relative address. Using this information, the programmer can usually locate the source of the error in a relatively short period of time.

Symbolic Debugger Interface

VAX/VMS provides facilities to aid the debugging of programs written in the native mode languages. It accomplishes this via a program known as the interactive symbolic debugger. The debugger can be linked with a program image to control execution during application development. It can be used interactively or can be controlled from a command procedure file. The debugging language is similar to the VAX/VMS command language. Expressions and data references are similar to those of the source language used to create the image being debugged. Debugging statements can be conditionally compiled.

Debugging commands include the ability to start and interrupt program execution, to step through instruction sequences, to call routines, to set break or trace points, to set default modes, to define symbols, and to deposit, examine, or evaluate virtual memory locations. Windowing capabilities allow the definition of windows for editing source files while debugging.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.01.xx

Product Description

MicroVMS is VMS repackaged for the microcomputer environment. The MicroVMS Operating System supports the MicroVAX processors, and is fully compatible with VMS. MicroVMS provides the same features as VAX/VMS on any other single VAX processor with the exception of compatibility mode. MicroVMS is suitable for both time-sharing and production environments. Time-sharing users can work interactively with the system and submit batch jobs. Jobs of all types including processor intensive, I/O intensive and real-time, in any mix, perform well on MicroVMS. The system permits an absolute limit of 8192 concurrent processes. However, the actual amount of work supported at one time with good performance depends on the types of processing performed as well as on physical memory and secondary storage available.

The MicroVAX architecture is a subset of the full VAX architecture, consequently some instructions are not implemented in the hardware. MicroVMS provides instruction emulation for all native VAX instruction not implemented in the MicroVAX hardware. This emulation is totally transparent to the user. However, compatibility mode is not available on MicroVAX.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

28.05.xx

VAX APL

APL (A Programming Language) is a concise programming language that can be used for a wide range of applications. It simplifies the handling of numeric and character data organized as lists and tables.

VAX APL is a native-mode, sharable, reentrant interpreter that runs under the VAX/VMS operating system. It provides a built-in function editor, debugging aids, system communication facilities, and a file system. VAX APL can execute lines of code immediately or store the code for later execution.

VAX APL uses virtual memory to create a "workspace" that can expand dynamically as needed and uses the VAX floating point and character string instructions.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.31.xx

VAX BASIC

VAX BASIC is an interactive, sharable language processor for the VAX/VMS operating system. VAX BASIC takes full advantage of the VAX floating point, decimal, and character instructions.

VAX BASIC provides a high-performance program development environment for both application development and timesharing, by generating on-line VAX native mode instructions. It combines the interactivity of immediate-mode program debugging with the power of a structured programming language integrated with key components of the VAX Information Architecture.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.36.xx

VAX BLISS-16

VAX BLISS-16 is a high-level systems implementation language especially intended for the development of systems software such as operating systems, compilers, runtime system components, database and file systems, communications software, and utilities for use on PDP-11 systems.

An advanced set of language features supports development of modular software according to structured programming concepts. Hardware features of the PDP-11 are provided in order to facilitate programming of realtime and/or hardware-dependent applications.

The BLISS-16 cross-compiler translates BLISS-16 source programs into relocatable PDP-11 object modules. It runs in native mode under the VAX/VMS operating system. Many features of BLISS-16 are machine-independent; collectively, this set of common features is known as "Common BLISS" and can be used to develop transportable programs that will run on VAX and other Digital computer systems.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.19.xx

VAX BLISS-32 is a high-level systems implementation language for VAX systems. BLISS-32 supports development of modular software according to structured programming concepts by providing a rich and advanced set of language features to facilitate programming of realtime and/or hardware-dependent applications.

VAX BLISS-32 is especially intended for the development of operating systems, compilers, runtime system components, database file systems, communications software, and utilities.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.12.xx

VAX C

VAX C is a general purpose programming language featuring modern control and data structures with concise operations. It is an integrated VAX/VMS layered language product – programmers have available to them all of the services and program development aids that the VAX/VMS system provides. It is based on “The C Programming Language,” described by Kernighan and Ritchie, and developed by Bell Laboratories.

VAX C offers optimized, sharable, position-independent native VAX code, fast compilation speeds, and the ease and flexibility of development that comes with using a language integrated within the VAX/VMS environment.

It features modern control constructs for efficient, structured programs; simple and concise operators; user-defined, or “enumerated” (ENUM), data types; an extensive library of runtime support routines, including standard I/O, math and string functions; and access to the VAX Common Run-Time Library. Also, C offers runtime support to aid UNIX™ to VAX/VMS migration, including emulation of many of the UNIX-specific routines, VAX Symbolic Debugger support, extensive global and local optimization of generated code for reduced code size and increased execution speed, and compiler-generated listings with several options.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.38.xx

™UNIX is a trademark of AT&T Bell Laboratories, Inc.

VAX COBOL

VAX COBOL is a high-performance, interactive language for business data processing based on the ANSI X3.23-1974 standard. VAX COBOL also incorporates many features planned for the upcoming ANSI standard, including more structured programming to allow simplification of complex coding procedures.

VAX COBOL takes full advantage of the VAX hardware, generating inline instructions for high-speed compilation and program execution and support of larger programs. It includes full implementations of nine ANSI modules, including SORT/MERGE. Utilities are included to aid users in migrating other COBOL programs to VAX COBOL.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.04.xx

VAX CORAL 66 is a high-level block-structured programming language. It is the standard, general purpose language prescribed by the British government for realtime applications and systems implementation. It is defined in the "Official Definition of CORAL 66" published in 1973 by Her Majesty's Stationery Office (ISBN 011 4702217).

The VAX CORAL 66 compiler is implemented in accordance with the Official Definition. In addition, the compiler provides:

- BYTE and DOUBLE (64-bit floating point) numeric types.
- Generation of reentrant code at the procedure level.
- LONG numeric type supported and implemented as a standard VAX 32-bit integer, for compatibility with PDP-11 CORAL. VAX CORAL 66 is designed to replace assembly level programming in a number of commercial, process control, research, and military applications. It is particularly adapted to long-life products requiring flexibility and ease of maintenance.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.37.xx

CORAL 66/VAX to RSX Cross Compiler

The CORAL 66/VAX to RSX Cross Compiler operates under the VAX/VMS operating system. Code generated by the Cross Compiler and linked under VAX/VMS with the appropriate Object Time System (OTS) supplied with this product may be run under VAX/VMS compatibility mode.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.69.xx

VAX DIBOL

VAX DIBOL (Digital Interactive Business Oriented Language) is a high-level, procedural language designed for data processing in the business environment. VAX/VMS provides a timesharing environment for DIBOL program development and execution. The VAX DIBOL takes full advantage of the VAX architecture, featuring a native-mode compiler, interpreter, subroutine library, and utilities. VAX DIBOL is highly compatible with DIBOL-11, retaining all its capabilities and advantages while providing an expansion path for applications requiring the power of VAX/VMS.

VAX DIBOL consists of a DIBOL compiler, a DIBOL program debugging aid, and a set of utility programs that facilitate data handling and report generation. The language provides a means of using the data management facilities of the VAX/VMS operating system. These facilities, known as Record Management Services (RMS), provide for the following data organization and accessing options: sequential, random (or relative) and indexed sequential access.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.49.xx

VAX FORTRAN

VAX FORTRAN is an optimizing FORTRAN compiler designed to achieve high execution speed. It is an implementation of full-language FORTRAN-77, which is based on ANSI FORTRAN X3.9-1978. The sharable, reentrant compiler takes full advantage of the VAX floating point and character instruction set and the VAX/VMS virtual memory operating system. It includes switch-selectable support for programs conforming to the previous standard, ANSI X3.9-1966.

VAX FORTRAN also provides a number of extensions beyond the current ANSI standard, including language elements for keyed and sequential access to VAX RMS multikey ISAM files and a set of data types beyond those specified for full language FORTRAN-77.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.16.xx

VAX PASCAL

VAX PASCAL is an implementation of the PASCAL language that accepts programs compatible with either level of the ISO specification for computer programming language PASCAL (draft proposal 7185). PASCAL is a structured high-level language that provides a modular, systematic approach to computerized problem solving.

VAX PASCAL is an optimizing compiler providing numerous extensions, including separate compilation, character string manipulation, random access to VAX relative files and keyed access to VAX multikey indexed files.

VAX PASCAL takes full advantage of the VAX hardware floating point and character instruction sets and the virtual memory capabilities of the VAX/VMS operating system.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.11.xx

VAX PL/I

VAX PL/I, a comprehensive and powerful language, supports scientific computation, commercial data handling and data organization, and extensive string manipulation capabilities. Block structuring provides for programs that are easier to understand and less error prone.

VAX PL/I is an extended implementation of the ANSI X3.74 PL/I General Purpose Subset. Extensions to the subset language are either full-language PL/I features, or system-specific features that provide more complete access to VAX/VMS features. The VAX PL/I compiler generates optimized, sharable, native object code.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.30.xx

FORTRAN IV/VAX-to-RSX is a software tool for the development and execution of RSX-11M or RSX-11S FORTRAN programs. It is based on ANSI FORTRAN, X3.9-1966. The compiler operates in compatibility mode under the RSX-11M Application Migration Executive (AME) on VAX/VMS systems. Programs compiled and tasks built can be transported to remote RSX-11M or RSX-11S target systems or executed on VAX/VMS in compatibility mode.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.17.xx

**PDP-11 FORTRAN-77
DEBUG/VAX To RSX**

PDP-11 FORTRAN-77 DEBUG is a fully symbolic debugger for FORTRAN-77 and MACRO-11 programs running under VAX-11 RSX. PDP-11 FORTRAN-77 DEBUG is a tool to aid in finding the location of programming errors in successfully compiled programs that do not execute properly. PDP-11 FORTRAN-77 DEBUG runs as a two-task debugger. A small portion of the code, necessary to debug applications, is linked with the user task and the major portion of the debugger runs as a separate task. PDP-11 FORTRAN-77 DEBUG provides access to program symbols by reading the symbols table file produced by the task builder. PDP-11 FORTRAN-77 DEBUG can understand symbols produced by PDP-11 FORTRAN-77 and MACRO-11.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.75.00

VAX RPG II

VAX RPG II is an extended implementation of the RPG II language developed by IBM as a problem-oriented language for commercial applications and including Digital extensions for integration with the VAX/VMS architecture. In general, VAX RPG II is a language processor that provides a convenient means of preparing a wide variety of reports and other commercial data processing applications. VAX RPG II runs under the VAX/VMS Operating System and consists of a compiler, editor, and Run-Time Library (RTL) support.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.05.xx

VAX LISP

VAX LISP is an implementation of Common Lisp, a dialect of Lisp (LISt Processing language), that runs on the VAX family of computers using the VMS operating system. With the exception of complex numbers, VAX LISP is a complete interactive Common Lisp environment.

Common Lisp is the work of a committee of individuals and institutions involved with artificial intelligence research and Lisp programming with the goal of standardizing and stabilizing the language and maintaining maximum compatibility with major existing Lisp implementations in MacLisp dialects and derivatives. The Common Lisp Reference Manual, written by Guy Steele and published by Digital Press, Spring 1984, is the standard reference for the language specifications.

Lisp was invented by Professor John McCarthy at MIT in the late 1950's for applications in artificial intelligence and software development where the symbolic processing of relationships between data is as important as numerical computations. Recursion is particularly easy and powerful in Lisp.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.82.xx

Courseware Authoring System

The Courseware Authoring System (C.A.S.) combines an easy to learn authoring language with a user interface and a utility package, for developing, delivering, and monitoring computer based instruction. C.A.S. runs under the VAX/VMS Operating System and requires a GIGI terminal.

C.A.S. components include the Authoring Language Compiler, run-time library, user interface, and utilities.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.95.xx

VAX™ ADA®

VAX ADA is Digital's validated implementation of the full ANSI-MIL-STD-1815-A-1983 Ada Language. The VAX Ada compiler runs under the VAX/VMS and MicroVMS Operating Systems, and generates optimized, shareable, and position-independent code. As a native-mode VMS language, VAX Ada is integrated into the VMS common language environment. All VMS system services and utilities are thus available to programs written in VAX Ada. VAX Ada supports VAX Record Management Services (RMS), including sequential, relative and indexed file organizations and associated access methods. VAX Ada programs can invoke modules written in other VMS languages. Additionally, programs written in other languages can invoke VAX Ada modules. Ada is a powerful, general-purpose language with integrated facilities supporting many modern programming practices. Ada is suitable for a variety of applications, including system programming, computational programming, general programming, and real-time programming. Ada provides language features for multi-tasking such as tasks, rendezvous, priorities and entry calls.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.60.xx

DECnet-VAX

With DECnet-VAX, a suitably configured VAX/VMS system can participate as a routing or end node in DECnet computer networks. Using DECnet-VAX Version 3.1, DECnet computer networks can contain up to 1,023 nodes given proper network planning. DECnet-VAX interfaces are standard components of VAX/VMS for use on a local, stand-alone system. The DECnet-VAX software, when installed on a VAX/VMS system, allows communication between different, networked systems that use the same protocols.

DECnet-VAX is a Phase IV network product and is warranted for use only with Phase III and Phase IV products supplied by Digital.

DECnet-VAX offers task-to-task communications, file management, downline system and task loading, network command terminals, and network resource-sharing capabilities using the Digital Network Architecture (DNA) protocols. DECnet-VAX communicates with adjacent and nonadjacent Phase III and Phase IV nodes. Adjacent nodes control opposite ends of a point-to-point communication line.

DECnet-VAX uses DEUNA, DMR11, DMP11, DMF32, and CI780 communications controllers to interface with other network nodes. Each of these devices uses the Digital Data Communications Message Protocol (DDCMP) to provide full- or half-duplex communication over point-to-point synchronous lines. The DMP11 and DMF32 use DDCMP to provide full- or half-duplex communications over multipoint lines. The DMF32 synchronous line uses the DDCMP protocol implemented in the software. The DMR11 and DMP11 are DMA UNIBUS peripherals which implement line control and error recovery procedures in microcode.

The DEUNA, when used in conjunction with the H4000 transceiver, allows DECnet-VAX to utilize Ethernet as its datalink transmission media.

Support Category

Digital Supported/Digital Installation Recommended

S.P.D. Number

25.03.xx

DECnet Router/X.25 Gateway

The DECnet Router/X.25 Gateway connects DECnet nodes on an Ethernet to DECnet nodes on an X.25 packet-switched data network (PSDN) using the Data Link Mapping (DLM) capability of the Gateway software. In addition to performing all the functions of the DECnet Router, the DECnet Router/X.25 Gateway also gives those VAX host systems on the Ethernet that have the VAX X.25/X.29 Extension Package (XEP) access to the facilities offered by the PSDN to which the Router/Gateway is connected.

The DECnet Router/X.25 Gateway implements Phase IV DECnet routing and network management. Through the use of Phase IV DECnet protocols DECnet networks can contain up to 1,023 nodes given proper network planning. Each Router/Gateway can be configured to route a maximum of 400 DECnet nodes. The Router/Gateway is compatible with Phase III implementations.

Support Category

The Software Product Description must be consulted for complete configuration guidelines and limitations.

S.P.D. Number

30.41.xx

The DECnet/SNA Gateway allows a DECnet network and an IBM Systems Network Architecture (SNA) network to cooperate by connecting the two networks. The DECnet/SNA Gateway links the two vendors' network environments, rather than merely providing single-function communications emulation between two computers. In effect, the DECnet/SNA Gateway makes available to the user the complementary strengths of both the Digital and IBM network environments.

Users can interact the SNA-based subsystems in the following ways: 3270 Terminal Emulation, Remote Job Entry (RJE), or program-to-program communication. These functions are provided by host-based access routines—software packages that allow the host system users to perform the above functions on IBM host systems connected to the SNA network.

Support Category

The Software Product Description must be consulted for complete configuration guidelines and limitations.

S.P.D. Number

30.15.xx

**DECnet/SNA VMS
Printer Emulator**

DECnet/SNA VMS Printer Emulator (PrE) is a layered software product that allows suitably configured VAX/VMS or MicroVMS systems within a DECnet network to receive printable data from IBM host-based applications. These applications will originally have been developed to produce output for an IBM 3287 printer in system mode that is connected to an IBM 3274 cluster controller in a Systems Network Architecture (SNA) networking environment. Access from the IBM system to VAX/VMS systems is via the DECnet/SNA Gateway. In an IBM environment data transfer is one way, from host to printer, and generates hard copy. The PrE Access software will allow VAX/VMS users to direct the received output either to be printed via the VAX/VMS Print Symbiont or spooled to a disk file.

Support Category

The Software Product Description must be consulted for complete configuration guidelines, support information and limitations.

S.P.D. Number

26.70.xx

DECnet-ULTRIX

With DECnet-ULTRIX, a suitably configured ULTRIX-32 system can participate as an end node in DECnet computer networks. Using DECnet-ULTRIX Version 1.0, DECnet computer networks can contain up to 1,023 nodes given proper network planning. The DECnet-ULTRIX software, when installed on an ULTRIX-32 system, allows communication between different, networked systems that use the same protocols. DECnet-ULTRIX is a Phase IV network product and is warranted for use only with Phase III and Phase IV products supplied by Digital. DECnet-ULTRIX offers task-to-task communications, file management, network command terminals, and network resource-sharing capabilities using the Digital Network Architecture (DNA) protocols. DECnet-ULTRIX communicates with adjacent and nonadjacent Phase IV nodes on the Ethernet or with any Phase III/IV node via a routing node or the same Ethernet. DECnet-ULTRIX uses the DEUNA communications controllers to interface with other network nodes. This device uses the Digital Data Communications Message Protocol (DDCMP) to provide full- or half-duplex communication over point-to-point synchronous lines. The DEUNA, when used in conjunction with the H4000 transceiver, allows DECnet-ULTRIX to utilize Ethernet as its datalink transmission media. DECnet-ULTRIX also allows the ULTRIX Communication Protocol, TCP/IP, to coexist with it on the same Ethernet.

Support Category

Digital Supported/Digital Installation Recommended

S.P.D. Number

26.83.xx

The DECnet Router Server is a software product that runs on an Ethernet Communications Server hardware unit to provide DECnet routing functions in a network of one or more host computers. These hosts may be Phase IV routing nodes or endnodes, or Phase III routing nodes or endnodes (e.g.; DECnet-RT, Version 2.1 and DECnet/E, Version 2.0). The DECnet Router Server connects directly to the Ethernet to provide routing to nodes off the Ethernet connected via the unit's synchronous/asynchronous lines. Phase IV DECnet networks are hierarchical networks that can be segmented into areas. The DECnet Router supports both intra-area (Level 1) and inter-area (Level 2) routing for transporting messages between nodes. These nodes can be remote Phase III/IV routing nodes or endnodes in the same area or different area, or other DECnet Router Servers connected to the other Ethernets in the same area or different areas. Endnodes connected directly to an Ethernet must use DECnet Router Servers or Phase IV host routing nodes on the same Ethernet for message routing off that Ethernet. A routing node is not required on an Ethernet if the endnodes connected to that ethernet communicate only with each other. However, if the Ethernet directly connects nodes with different area addresses, an area routing node is required to transport messages between these areas. Use of the DECnet Router Server offloads certain communication processing on host nodes that would otherwise serve as routing nodes on the Ethernet.

Support Category

The Software Product Description must be consulted for complete configuration guidelines, support information and limitations.

S.P.D. Number

30.34.xx

WPS-PLUS/VMS

WPS-PLUS/VMS is a document processing software system that provides Gold Key style word processing for VAX/VMS users. WPS-PLUS/VMS allows VAX/VMS users to:

- Create, edit and print documents
- Produce form letters and maintain mailing lists
- File and retrieve documents by document name, number, or keyword
- Include data from a VMS application in a document
- Convert a WPS-PLUS document to a VMS file
- Use VMS mail to mail a document (which is first converted to a VMS file)
- Include technical characters and scientific equations in a document
- Include diagrams, matrices and VT100 character set equations in a document
- Perform self-training using computer-based instruction

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.27.xx

DECdx/VMS is a layered software product that resides on VAX/VMS host systems. DECdx/VMS enables WPS-8 based systems, both standalone and shared resource, and the host to be linked together for better system utilization, document exchange, and information and data sharing.

Users of DECmates and other Digital WPS-8 based systems can use DECdx/VMS to transfer documents between the WPS-8 system and the VAX/VMS host over a serial line interface. The WPS word processing document formats and print control characters are retained. During a DECdx/VMS session, the WPS-8 system operates as though it were another terminal on the host system.

Communication between the WPS-8 and VAX/VMS systems uses the DIGITAL Standard Document Exchange (DX) error-detecting and error-correcting protocol and file format.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.36.xx

VAX KMS11-BD/BE X.25 Link Level Software

The VAX KMS11-BD/BE X.25 Link Level Software package consists of X.25 Level 2 firmware for the KMS11-BD/BE and a VAX/VMS device driver. The Link Level software package allows the VAX to perform high-speed, multi-line, synchronous communications in an X.25 point-to-point environment while minimizing VAX CPU load.

The primary purpose of the driver is to allow command, control and data information movement to/from VAX/VMS users, the KMS11-BD/BE firmware, and a remote end-of-the communication line. The driver is full-duplex and maintains internal queues.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.80.0

VAX KMS11-BD HDLC/BSC Framing Software

The VAX KMS11-BD HDLC/BISYNC (BSC) Framing Software consists of a VAX/VMS software driver and firmware for the KMS11-BD. The VAX/VMS software driver and the KMS11-BD firmware allow VAX/VMS users to build and implement custom or standard communication protocol without having to program the KMS11-BD.

The purpose of the KMS11-BD firmware is to provide the basic HDLC or BISYNC line framing of the messages received or to be transmitted from the VAX host application program (not supplied with this software) to provide the protocol line control. This program may be written in a higher level language which is supported on VMS systems.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.55.xx

MUX200/VAX allows communication between a VAX-11/780 or VAX-11/750 system and a CDC 6000, CYBER series, or other host computer system capable of using 200 UT mode 4A communications protocol. It can be configured to support either the ASCII or the external BCD versions of the protocol.

MUX200/VAX provides for one synchronous communication circuit to a host computer system and allows several users to communicate simultaneously with the host computer over a single line.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.02.xx

Professional Host Communications

Professional host communications allows files to be transferred between a Professional 300 and an RSX-11M, RSX-11M-PLUS, or VAX/VMS host system. Professional host communications is initiated by a Professional running PRO/COMMUNICATIONS in terminal emulation mode. After the professional host communications facility is started, the Professional switches from terminal emulation to file transfer mode. The files can then be transferred between the professional and the host system.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

30.29.xx

VAX PSI and PSI Access

VAX PSI (Packetnet System Interface) allows a suitably configured VAX/VMS system to connect to Packet Switching Data Networks (PSDNs) conforming to the CCITT recommendation X.25. Access to VAX PSI is supported for VAX/VMS user programs written in VAX MACRO and native mode high-level languages such as VAX FORTRAN. Programs executing in PDP-11 compatibility mode cannot use VAX PSI. VAX PSI supports process-to-process and remote terminal communications via the network. Consult the VAX PSI Software Product Description for a list of countries networks that are supported by VAX PSI.

VAX PSI is a layered product on VAX/VMS. PSI allows the use of DECnet-VAX facilities over X.25 circuits in addition to DECnet's support for private or switched telephone networks. A DECnet-VAX license is required for communication with other DECnet nodes over X.25. For details please refer to the DECnet-VAX Software Product Description, Number 25.03.xx.

Support Category

Digital Supported/Digital Installed

S.P.D. Number

25.40.xx

VAX 2780/3780 Protocol Emulator (PE) allows data files to be transferred between VAX systems and other host computer systems capable of using 2780 or 3780 communications protocols. VAX 2780/3780 emulates Binary Synchronous Communications (BSC) protocol, appearing to be an actual IBM 2780 or 3780 Remote Batch Terminal on a point-to-point line.

The product can run concurrently on up to four lines, each with a different set of attributes (for example, some may be 2780, others, 3780) at speeds up to 9600 bits per second per line.

Minimum System Requirements: Any valid VAX/VMS system configuration, excepting the VAX-11/782, with a DUP11 synchronous communication interface and at least 512 KB of memory.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.07.xx

VAX 3271 Protocol Emulator

VAX 3271 Protocol Emulator (PE) enables VT100 terminals and application programs on VAX systems to interact with IBM system application programs and system devices.

The Terminal Emulator utility allows the VT100 user on a VAX system to access an IBM system. This feature is useful for users who are implementing distributed processing with VAX systems. Users who are moving applications from centralized mainframes to VAX distributed processors will find this capability an efficient migration tool during the transition phase; users who occasionally access applications that remain on mainframes can access those applications through their local VAX systems.

The application program interface provides a base for distributed applications where one component of the applications runs on an IBM system and the other component on a VAX system. This type of application is useful in situations such as online access and update of a mainframe database in response to an event on the VAX, or where it is inappropriate to present a 3270-style formatted screen to a user who is accustomed to VAX-style screens.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.21.xx

LAT-11

LAT-11 is a special purpose software system that enables a PDP-11 to be used as a Local Area Terminal Server on Ethernet. When host nodes and a PDP-11 system running LAT are appropriately configured, Ethernet terminals connected to the system can appear to have a direct physical connection to the host node. LAT-11 establishes a logical link between a terminal and a host node rather than a physical link. The LAT-11 Terminal Server allows users access to all host nodes on an Ethernet supporting LAT protocol. The LAT-11 supports up to 64 terminals at speeds from 100 bits per second to 19.2 Kbits per second. The software also provides modem control and monitoring, automatic line speed detection, and XON/XOFF handling.

LAT-11 software increases the functionality of VAX/VMS host nodes on an Ethernet and in a VAXcluster. LAT-11 software provides multiple simultaneous logical links to multiple host nodes. The LAT-11 software running on a PDP-11 allows users, especially in a VAXcluster, to utilize the processor with the greatest available computing capacity. It also provides automatic login failover which allows a user to continue processing in an environment where one of the host nodes fails. This offers users enhanced terminal security and protection of data and programs.

LAT-11 supports the following terminals; LA12/36/100/120, VT52, VT100 series, VT200 series, and the PRO 300s and Rainbow series (in VT100 emulation mode). LAT-11 hardware requirements are as follows, a PDP-11/24/34A/35/40/44/60/70 CPU with 256KB of memory, RX02 or TU58 load device, console terminal, DEUNA Ethernet controller, H4000 transceiver, and 2 DZ11s. In addition the host node requires any valid VAX/VMS (V3.6 or later) configuration with DECnet, connected to an Ethernet. Additional DZ11s can be added (up to a maximum of eight, configuration dependent).

The Software Product Description must be consulted for complete configuration guidelines and limitations.

Support Category

Digital Supported/Digital Installed

S.P.D. Number

15.32.xx

DECserver 100 Terminal Server

The DECserver 100 Terminal Server is a network terminal switch for Ethernet Local Area Networks. The DECserver 100 provides a convenient method to logically connect up to eight Digital asynchronous terminals to one or more service nodes (hosts) on an Ethernet. Once the terminal is connected, the user can utilize applications programs and utilities as though a terminal were directly connected to that host via a DZ11 or DMF32 device. Thus, it may be possible to utilize the DECserver 100 to connect all terminals to service nodes in place of traditional interfaces, except for a console terminal. The DECserver 100 implements the Local Area Transport (LAT) protocol for communication with service nodes that implement this protocol on the same Ethernet. This new interface has been optimized for high terminal I/O performance over an Ethernet while reducing the host CPU cycles required to handle interrupts. Hence, under most I/O loading conditions, a significant performance gain may be realized by using the DECserver 100 over direct terminal connections.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.43.xx

Ethernet Terminal Server

The Ethernet Terminal Server is an efficient network terminal switch for Ethernet Local Area Networks. The Ethernet Terminal Server provides a convenient method to logically connect up to 32 Digital asynchronous terminals to one or more service nodes (hosts) on an Ethernet. Once the terminal is connected, the user can utilize local applications programs and utilities as he/she would through a terminal directly connected to that host via a DZ11 or DMF32 device. As such the Ethernet host(s) need not have any direct terminal connections other than for a console.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.35.xx

VAX Common Data Dictionary (CDD)

The VAX Common Data Dictionary (CDD) provides for a VAX/VMS system a single logical data dictionary, containing definitions for VAX ACMS, VAX BASIC, VAX COBOL, VAX DATATRIEVE, VAX DBMS, VAX DIBOL, VAX PL/1, and VAX TDMS.

The CDD contains all VAX DATATRIEVE definitions (records, domains, tables, procedures and graphic plots). It also contains the VAX DBMS definitions for schemas, storage schemas, security schemas and subschemas, and the VAX TDMS form and request definitions. VAX ACMS task, menu, application, and task group definitions are also stored in the CDD.

The CDD contains record definitions that VAX BASIC, VAX COBOL, VAX DIBOL, and VAX PL/1 can optionally include at compile time.

Note: The VAX Common Data Dictionary is prerequisite software for VAX DATATRIEVE, VAX DBMS, VAX TDMS, and VAX ACMS; therefore, it must be installed before any of these other products.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.53.xx

VAX DATATRIEVE

VAX DATATRIEVE is a comprehensive, fourth generation data management tool that provides both interactive and program-callable access to data in sequential, indexed, or relative file organizations. It consists of a query and report writing facility, a business graphics capability, and both local and distributed high-level data access facilities to retrieve data stored by RMS, VAX Rdb, and VAX DBMS files on VAX/VMS systems.

VAX DATATRIEVE can display information as a report or a simple hardcopy table. VAX FMS, VAX ACMS and VAX TDMS forms can even be displayed graphically on a VT100- or VT200-family terminal. Finally, VAX DATATRIEVE provides an efficient way to access data stored on other VAX systems and on PDP-11 systems running DATATRIEVE-11. Prerequisite: VAX Common Data Dictionary.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.44.xx

PDP-11 DATATRIEVE/VAX is an interactive, query report generation and data maintenance system which runs under the VAX/VMS Operating System in compatibility mode. It is self-teaching and requires little previous computer experience for the user to take full advantage of its capabilities. PDP-11 DATATRIEVE/VAX accesses data contained in disk files of sequential, indexed or relative organization. It provides facilities for selective data retrieval, sorting, formatting, updating, and report generation without the need for programming overhead. Record and domain (file) definitions entered in PDP-11 DATATRIEVE/VAX are stored in Data Dictionaries shared by users. The Dictionaries can be used to store frequently used sequences of commands to be recalled and processed later. Additional commands are provided to list the contents of the Data Dictionary, to delete entries, and to control access to individual entries in the Data Dictionary. A dictionary compression utility is available to clean up the Data Dictionary index file.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.14.xx

VAX DBMS

VAX DBMS is a full-function, CODASYL-compliant database management system based on the ANSI Data Definition Language Committee's March 1981 Working Document. Suitable for both small and large database applications it creates, updates and maintains databases ranging in complexity from simple hierarchies to complex networks with multilevel relationships. A runtime version of VAX DBMS is available at reduced cost.

DBQ, an interactive and program-callable database query language included with VAX DBMS, simplifies the writing and checking of VAX DBMS data access statements. Embedded DML (Data Manipulation Language) is available for VAX COBOL and VAX FORTRAN. Prerequisite: VAX Common Data Dictionary.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.48.xx

VAX TDMS

The VAX Terminal Data Management System (TDMS) is a programmer productivity tool designed for the implementation of interactive, forms-intensive applications running on the VAX/VMS operating system. It replaces application program logic specific to terminal interactions with definitions that are external to the program.

VAX TDMS provides a fourth-generation language, record-level interface to define screen/program data exchange, resulting in terminal/data independence. Application data processing is accomplished via third-generation language programming and calls to VAX TDMS functions. VAX TDMS also provides transparent application program data mapping and conversion with existing RMS, VAX DATATRIEVE, VAX DBMS and VAX Rdb/VMS record definitions. VAX TDMS forms are supported by the latest version of VAX DATATRIEVE. Prerequisite: VAX Common Data Dictionary.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.71.xx

VAX ACMS (Application Control and Management System) provides tools for the development and control of complex on-line, transaction processing applications. These tools can reduce application development and maintenance time by replacing significant amounts of control and application code with definitions stored in the VAX Common Data Dictionary (CDD).

A wide range of transaction processing and other complex on-line applications can be developed and controlled with ACMS, including operations support, inquiry and information retrieval, and accounting. VAX ACMS can control applications developed with ACMS as well as pre-existing VAX/VMS applications. An interface allowing ACMS applications to execute in an ALL-IN-1 environment is provided, producing an integrated office automation/data processing solution. As part of the VAX Information Architecture, ACMS requires the VAX CDD for storing definitions. Also, any VAX ACMS system requires VAX TDMS for menu processing. Prerequisites: VAX CDD and VAX TDMS.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.50.xx

VAX FMS

VAX FMS Forms Management System is designed to aid in the development of programs that use video forms. VAX FMS manages the forms for applications programs that use Digital's family of VT100-compatible terminals. Forms defined using FMS provide the programmer with the ability to use the following features of Digital's family of VT100-compatible terminals:

- Individual character attributes of reverse video, bold, blinking and underline
- Line attributes of double width, double height and scrolled
- Screen wide attributes such as 80 or 132 column lines and reverse video
- Alternate character sets including the VT100 "special graphics character set" for line drawing.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.10.xx

VAX Rdb/VMS

VAX Rdb/VMS is a full-function, relational database management system for both local and remote database applications. It supports applications that run under VAX/VMS on the full range of VAX processors. VAX Rdb/VMS implements the Digital Standard Relational Interface (DSRI). This allows programs running on any VAX or MicroVAX node in a DECnet network to access all other VAX Rdb/VMS or VAX Rdb/ELN databases in the network.

VAX Rdb/VMS is a major component in the VAX Information Architecture, a set of information management products that work together to significantly improve user productivity in developing applications.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.59.xx

VAX Rdb/ELN is a high-functionality, high-concurrently relational database management system specifically designed for the VAXELN operating environment. It is intended to be used for dedicated, time-critical and /or distributed applications running in a distributed environment.

VAX Rdb/ELN applications are developed using the VAXELN development toolkit on a host VMS system. The resultant executable application program is loaded on the target VAXELN system by disk media or by an Ethernet link. If an Ethernet link exists between the host and target systems, it can also be used for remote debugging.

A VAX Rdb/ELN application, running on a VAXELN target system, may access its local databases and remote databases located on other VAX Rdb-supported nodes. It follows that remote VAX Rdb applications may access the databases located on the target system.

Both VAX Rdb/ELN and VAX Rdb/VMS adhere to the Digital Standard Relational Interface (DSRI) Architecture. This compatibility means that any program written to use either of these products can access data managed by the other product. And VAX DATATRIEVE running on a VMS host can access VAX Rdb/ELN databases over the Ethernet.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

28.03.00

VAX DSM

VAX DSM is a multiuser, data management system that includes Digital Standard Mumps (DSM). This high-level interpretive language is an extension of the American National Standard MUMPS specification X11.1-1977; also included are the enhancements to the MUMPS language proposed by the MUMPS Development Committee as of 1982. The sharable, reentrant interpreter operates under the VAX/VMS Operating System to take advantage of the packed decimal and character string instruction set, the virtual memory, and the I/O capabilities of the operating system.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

25.08.xx

VAXELN Toolkit

The VAXELN Toolkit is a VAX/VMS layered product that supports the development of stand-alone, statically defined software systems (VAXELN systems) that run on VAX superminicomputers and MicroVAX microcomputers. A finished VAXELN system runs on the target computer by itself, without VAX/VMS or any other operating system present.

Typically, although not necessarily, VAXELN applications are "realtime" applications, and the product aims to simplify the design and implementation of such systems by offering a high-level implementation language (Pascal), a conceptually simple and small kernel executive, and pregenerated optionally included service programs and device drivers which implement a file system, network communication facilities, and I/O device handling via the Pascal language.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

28.02.xx

Professional Host Tool Kit

The Professional Host Tool Kit consists of programming tools and libraries which allow development of applications for the Professional 300 series of computer systems. Programming languages available to the developer for building Professional based applications are BASIC-PLUS-2, COBOL81, DIBOL, FORTRAN-77, MICRO-11, and PASCAL. The development process uses a host VAX/VMS, RSX-11M, or RSX-11M-PLUS system for applications development. An editor provided with the host system is used to develop source files. MACRO-11 or a separately available Tool Kit language is used to assemble or compile the source program. The program is then linked against the libraries provided with the Tool Kit and the frame builder is used to prepare the menu and help frames. The resultant files are then transferred to a Professional 350 or Professional 380 with hard disk for debugging.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.28.xx

The Professional Host Tool Kit BASIC-PLUS-2 is a significantly extended BASIC compiler that takes full advantage of the floating point and integer instructions, as well as the capabilities of the Professional Operating System. BASIC-PLUS-2 provides a high performance program execution environment for applications development by generating threaded code instructions. It combines interactive program debugging with the power of a structured programming language. An application is compiled on systems running RSX-11M, RSX11M-PLUS or VAX/VMS, as part of the Professional Host Tool Kit, and subsequently linked and moved to the Professional 350 with hard disk for debugging and execution.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.27.xx

**Professional Host Tool Kit
COBOL-81**

Professional Host Tool Kit COBOL-81 is a high level language for business data processing that generates programs for execution under control of the P/OS Operating System. It is based upon the 1974 ANSI COBOL Standard X3.23.-1974 and includes some of the features planned for the next COBOL standard. This COBOL-81 is compatible with COBOL-81/RSX. shares some common syntax with VAX COBOL, and includes various Digital extensions to COBOL, including screen handling at the source language level.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.31.xx

Professional Host Tool Kit DIBOL

Professional Host Tool Kit DIBOL is a high level procedural language designed specifically for interactive business data processing. It allows development of DIBOL application programs for the Professional 300 series of computers on a VAX/VMS, RSX-11M or RSX-11M-PLUS host system.

The DIBOL program development process consists of compiling the DIBOL source program using the DIBOL-83 compiler, linking the object programs with external subroutines and library modules, and developing any required Help or Menu frames with the Frame Development Tool on the host system. The application and any frame files can then be transferred to the Professional system over a standard terminal interface line and executed and debugged on a Professional Series computer.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.26.xx

Professional Host Tool Kit FORTRAN-77 is an extended implementation of the ANSI subset FORTRAN-77 standard (X3.9-1978) that runs on the Professional 300 Series Application Development System. Professional Host Tool Kit FORTRAN-77 contains the features of the ANSI FORTRAN-77 subset, many of the full-set language features, and extensions that are not included in the ANSI FORTRAN-77 standard. Switch selectable support is provided for user programs based on the previous ANSI FORTRAN standard (X3.9-1966).

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.38.xx

**Professional Host Tool Kit
FORTRAN-77 DEBUG**

Professional Host Tool Kit FORTRAN-77 DEBUG is a fully symbolic debugger for FORTRAN-77 and MACRO-11 which run on the Professional 300 Series Applications Development System. Professional Host Tool Kit FORTRAN-77 DEBUG is a tool that aids in finding the location of programming errors in successfully compiled programs that do not execute properly.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.42.xx

Professional Host Tool Kit Pascal

Professional Host Tool Kit Pascal is an extended implementation of the PASCAL language. The extensions assist the application programmer in accessing the P/OS system capabilities and simplify application design. In addition there is a high degree of compatibility with VAX PASCAL and the ISO and ANSI Pascal standards.

Professional Host Tool Kit Pascal is a true, optimizing compiler. This software, running on a host VAX/VMS, RSX-11M or RSX-11M PLUS system, generates PDP-11 instructions for eventual execution on a target Professional 300 Series system. The compiler itself runs in the Tool Kit environment. The generated code has full access to the graphics library, menu services, and communications services.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.30.xx

Professional Real Time Interface Library provides subroutines to control real time data transfers to and from a variety of external devices in conjunction with the PC3XX-AA Real Time Interface Module for the PC350 personal computer. This library includes interface software to drive the module's two RS232/423 serial lines, IEEE-488 bus and 24-bit parallel digital port. It also includes utility routines to simplify data conversion.

Professional Real Time Interface Library supports three types of operation:

- Hardware initialization
- Establishment of handshaking or flow control parameters
- Data transfers to, from, or between devices interfaced to the PC3XX-AA

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.37.xx

DEC/MMS

VAX DEC/MMS is Digital's Module Management System designed to save programming time. It gives programmers an easy mechanism for maintaining current versions of routines, files, or modules that have undergone many changes. VAX DEC/MMS acts as a command procedure to control the building of a software system efficiently. It determines which components in a described system have changed and rebuilds the system by updating only those components that require updating.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.03.xx

DEC/CMS

DEC/CMS (Digital Equipment Corporation Code Management System) is a set of commands to help software developers manage the files of an ongoing project. It enables users to keep ASCII text files in a project library, retrieve previous file generations, get reports of modified files, learn the origin of each line of a file, manage and merge concurrent or separately developed modifications, and keep related files together as a single element.

Each CMS command is invoked from the operating system's command level to perform a specific function, such as reserving a file for modification or obtaining a report of development status. The user may edit, compile and test in the usual manner when each command returns to the operating system's command level. All text files are stored in a project library and each project has its own library, which the user identifies at the beginning of a session by means of the CMS SET LIBRARY command. ASCII text files may be stored in the project library, including source programs, command files, documentation and test data.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.52.xx

Digital's Application Development Environment (ADE) is a software package for the non-programmer who will develop small, simple applications requiring the processing of alphabetic, numeric and data-oriented data such as personnel records, order processing, department budgets, financial/forecasting models, mail and telephone lists. ADE provides easy to use facilities and functions for users to create their own databases, add, change or delete data, produce simple bar graphs and write reports without waiting for formal programming and report generation.

Features total interactivity between terminal and user, absence of technical jargon, and acronyms; easy transfer to and from more powerful applications software which use RMS sequential files and languages such as (COBOL, BASIC-PLUS-2, VAX BASIC, DATATRIEVE); uses full screen handling; prompts user after each input; offers extensive "help" messages to explain all commands and provides user protection of data, and automatic sorting alphabetically, numerically, or in date order.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.76.xx

VAX DT07

VAX DT07 software allows the VAX/VMS operating system user to electronically connect a section of switchable UNIBUS, together with all attached peripherals, to the user's system. When the DT07 is connected, the switched peripherals operate as if they were permanently attached to that system. When the DT07 is disconnected, the switched peripherals are removed and are then available for connection to another system. Up to four systems can share a single switched UNIBUS via the DT07. Switching can be under program control or on a failover basis using the DT07's "watchdog" timer. VAX DT07 consists of a device driver and a Bus Switch Manager utility.

Support Category

Digital Supported/Customer Installed

VAX DECOR

VAX DECOR is a graphics subroutine package that provides interface between an application program and graphics devices. The interface is device independent and supports user-developed device handlers, as well as those supplied with VAX DECOR. The package includes commonly required device handler routines and detailed documentation, designed to guide and assist in the development of user-specified device handlers.

VAX DECOR is based upon the ACM/SIGGRAPH Graphics Standard Planning Committee's 1979 "CORE GRAPHICS PROPOSAL," and includes 20 direct and buffered output (level 2), a subset of synchronous input (level 2), and most "Raster Extensions."

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.5.xx

VAX ALL-IN-1 Office Menu is an integrated software package providing the following office applications on VAX/VMS-based systems—flow control facility, electronic mail, document processing, desk management including calendar and calculation, and forms development.

A flow control facility allows a user at a VT family terminal to select from an option menu, moving from one application to another. ALL-IN-1 Office Menu's application interfaces provide menu-driven access to applications such as electronic mail, document processing, calendar management and desk calculations. A Forms Driver enables the use of ALL-IN-1 Office Menu's standard, non-modified menus and applications when installed on a VAX/VMS system which is not running VAX/FMS.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.85.xx

DECType

DECType is a full-featured, DECmate-style word processing package designed to run on the VAX/VMS operating system. It provides word processing concurrent with data processing in a multi-user environment.

DECType provides industry-standard features such as menu-driven operation, cut and paste, forward and reverse scrolling, search and replace, automatic word wrap, subscripts, headers and footers.

In addition DECType provides a basic four-function editor math capability, user-defined keys for predetermined repetitive operations, and abbreviation and paragraph libraries, as well as the ability to cancel an editing session without changing a document.

DECType gives the user full control of printers. Users can remove documents from the print queue and view the status of all defined printers.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.56.xx

VAX DECrad

VAX DECrad is an application system for data management within a diagnostic radiology department. It provides diagnostic reports, billing information, scheduling, tracking and statistical information in a usable, flexible format.

VAX DECrad features the ability to register and track patients, schedule examinations, and create, edit and process radiology reports. DECrad manages the tracking of radiology library materials, such as x-ray film folders.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

25.77.xx

VAX DEChealth

VAX DEChealth integrates, analyzes, and reports employee and environmental surveillance data for occupational health professionals in industry, government agencies, and hospitals. VAX DEChealth allows access to vital medical, exposure, morbidity, mortality, work history and demographic data in order to study the relationship between chronic and acute health impairment and exposure to specific toxic agents.

The system permits correlation over time, of individual biologic responses with work area and specific agent exposures. This correlation provides the medical staff and the occupational health team with an early means of detection, treatment, intervention, and control of occupationally induced injury and illness.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

25.78.xx

VAX ReGIS Graphics Library (RGL)

The VAX ReGIS Graphics Library (RGL) is a collection of subroutines conforming to the standard VAX/VMS calling interface and designed to support the graphics capabilities of the VT125 which are picture drawing and data plotting. It is written in FORTRAN and executes under the VAX/VMS Operating System.

Support Category

Customer Supported/Customer Installed

S.P.D. Number

25.62.xx

ReGIS Software

The ReGIS software packages are a set of host resident graphics packages written in FORTRAN that support a wide range of graphics applications on a GIGI or VT125 terminal. These include:

- ReGIS Graphics Editor
- ReGIS Slide Projection System
- ReGIS Character Set Editor
- ReGIS DEC-RITE
- ReGIS Data Plotting Package

Support Category

Customer Supported/Customer Installed

S.P.D. Number

26.15.xx

PLXY-11/VAX

PLXY-11 is a software package designed to provide VMS programmers access to the plotting capabilities of Digital's LXY12/LXY22 graphics lineprinters. Using the PLXY-11 graphics subroutines, programmers can create software that prints out representations of data in graphs and charts with clear alphanumeric labeling. This makes PLXY-11 useful for equipping scientific, engineering, statistical, and econometric application programs with graphics.

To use PLXY-11, the programmer writes FORTRAN programs that call the appropriate subroutines in the PLXY-11 library. These subroutines convert the program's graphics requests into a series of vectors stored in an intermediate file. This file is submitted to the PLXY-11 post-processing task, which converts its vector data into raster format suitable to the LXY12/LXY22 graphics line-printers. The user then transfers this converted file to the graphics printer via a standard file-transfer utility such as PIP, where it is printed out by the system LP11 lineprinter driver.

Operating System	Media	Order Codes
11/730-VMS	TU58	QDS01-XG
11/750-VMS	TU58	QDS01-XG
11/780-VMS	RX01	QES01-XY

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.42.xx

VAX DECgraph

VAX DECgraph is an interactive business graphing tool that creates graphs for presentations, reports, decision support and electronic mailing to other users. Postage stamp-sized symbols called "icons" and multiple levels of on-line help are used extensively to speed and simplify the designing of graphs.

Data for graphs can be obtained in any of four ways—built directly through the keyboard, accessed via ASCII files, accessed via VAX DATATRIEVE, or generated using the VAX DECcalc spreadsheet software and loaded into DECgraph. VAX DECgraph can generate six basic types of graphs—line, scatter, stacked bar, cluster bar, histogram, and pie. A number of enhancements can then be made, such as fill underneath lines, automatic trend lines for scatter graphs, shadowing for bar graphs, isolation of pie graph section(s), and many more options.

Possible forms of output, depending on equipment available, include black and white single-and double-size printed hardcopy, instant color photographs, 35mm color slides, and color or black and white overhead transparencies.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.07.xx

VAX DECslide

VAX DECslide is a menu-driven text and diagram generating tool designed for both the office professional and for the business user with little or no computer expertise. Postage stamp-sized symbols called "icons" and multiple levels of on-line help are used extensively to speed and simplify the designing of slides for presentations and reports.

In addition to text, VAX DECslide can incorporate lines, triangles, polygons, arcs, circles, ellipses, squares, and rectangles. It can merge two created slides together to create a third illustration. And objects can be increased or decreased in size, rotated, moved, copied, or printed.

Possible forms of output, depending on equipment available, include black and white single-and double-size printed hardcopy, instant color photographs, 35mm color slides, and color or black and white overhead transparencies.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.11.xx

DECspell interactively scans text files to detect spelling and capitalization errors and provides suggestions when errors are found. Text files may be in the form of Standard ASCII or DX (DECmate format) on VAX/VMS. A master lexicon (dictionary word list) of 76,000 words is provided with the product. Additional word lists may be created for spelling verification during proofreading. DECspell may be layered on VMS or interfaced to the ALL-IN-1 system.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.34.xx

VAX VTX

VAX VTX is a fully-integrated videotex product that runs under the VAX/VMS operating system. VAX VTX is an interactive information update and retrieval product that allows users to retrieve information from a local or distributed information database. Any standard VMS products such as VAX DECgraph, VAX DECslide, EDT, or ALL-IN-1 can be used to create information for the database.

VAX VTX comprises three software products: a database server (SVR), a Terminal Control/Concentrator (TC/CON), and an Information Provider Assistance Tool (IPAT). A functionally complete system requires that all these components be present. However, they need not reside on the same processor as long as DECnet links exist among processors.

VAX VTX complies with the CCITT F.300 standards for videotex. No special terminals or printers are required. It supports any VT100 or VT200-compatible terminal. It can be called from an ALL-IN-1 office menu and information from the VAX VTX database can be incorporated in ALL-IN-1 documents and sent using electronic mail. Special Software Service assistance can be arranged to provide support of external information sources and other terminal types.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.57.xx

VAXsim

The VAX System Integrity Monitor (VAXsim) provides a realtime qualitative synopsis of events reported via the VMS error log mechanism. Accumulated information is very comprehensive, augmenting VMS "SHOW ERROR" counters. Interactive operation yields displays which are convenient, timely and more concise than traditional error log reports.

VAXsim gives system managers the means to troubleshoot their VAX systems quickly and easily. Capabilities include:

- Hierarchical graphic displays, highlighting problem areas
- Remote access capabilities which allow simultaneous monitoring of multiple systems from a single terminal screen
- A state-of-the art intelligent user interface which can automatically correct most common typographical errors

The VAXsim monitor processes error log data obtained directly from the VMS ERRFMT process via a mailbox interface. VAXsim displays allow a system manager to view the historical database interactively.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.62.xx

The VAXstation Display Services (VDS) is the software component of the VAXstation 100 terminal. VDS is an optional, layered VMS software product that should be ordered with the VAXstation 100.

VDS is comprised of the following components:

- VAXstation Human Interface
- Terminal Emulators
- VAXstation Display Management (VSTA) Library
- VAXstation Core Graphics (CGL) Library
- VAXstation Native Graphics Library

The VSTA and CGL libraries, as well as the Native Graphics procedures, are allable from seven VMS languages—Assembler, C, BASIC, FORTRAN, Pascal, PL/1, COBOL, and BLISS.

The multi-national character set is supported by VDS. Currently, VDS only supports the United States keyboard on the VAXstation 100 terminal.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.90.xx

RTEM-11

RTEM-11 provides the RT-11 program development environment on one of the following host development systems:RSX-11M, RSX-11M-PLUS and VAX/VMS. RTEM-11 runs in compatibility mode on VAX/VMS systems and allows several users to develop RT-11 applications concurrently on a host system. The number of users is dependent on CPU power and system activity. Application programs can be created, edited, assembled and linked on RTEM-11 and then executed on RT-11.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.21.xx

VAX Producer

VAX PRODUCER allows users to create visually-based, interactive programs such as Computer Based Instruction (CBI), point-of-purchase, marketing demonstrations or information retrieval systems.

VAX PRODUCER programs are made up of two components: a visual component created by the VAX DRAW Graphics Editor, and an interactive/branching component created using the VAX DESIGN Development Language. VAX DRAW, the graphics editor of the VAX PRODUCER system, allows a user to create screen displays and store them in a file called a Display Library. The VAX DESIGN Development Language is used to control the interaction with the user. VAX DESIGN source programs are preprocessed and linked into a file containing a pseudo-machine language that is system and address space independent. Programs written in the VAX DESIGN Development Language on a VAX/VMS system can be run without modification on any system with a PRODUCER interpreter. The PRODUCER Interpreter reads from the pseudo-code file and the Display Library to present the information and interact with the user. Refer to the PRO/PRODUCER Tool Kit SPD for more information.

Terminals supported in both ANSI and Regis mode include: VK100, VT125, VT220, VT240, and VT241. When running the PRO/Producer Terminal Emulator, the PRO 300 series with hard disc and the IVIS system are also supported as terminals with or with the DECtouch option. Each is capable of supporting both ANSI and CGL graphics.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.52.xx

VAX PRODUCER Interpreter

The VAX PRODUCER Interpreter reads and processes files produced by the VAX PRODUCER Development System. Two types of files are supported: display libraries, which are created by the VAX DRAW graphics editor and hold the visual information, and interpreter files, created by using the VAX DESIGN Preprocessor and Linker, which contain the branching, response, and judging information. VAX DESIGN is the language of the VAX PRODUCER used to create highly interactive and graphically oriented programs, and may be used in such applications as Computer Based Instruction (CBI), point-of-purchase, or information retrieval.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.53.xx

VAX INDENT

VAX INDENT is a data entry and forms management product for commercial application programs written in languages which run under the VAX/VMS Operating System and allow subroutine calls via the VAX-11 Procedure Calling Standard. VAX INDENT provides support for VT100 series and VT200 series (in VT100 mode) terminals and uses the following video features: reverse video, bold, underline, blink, 132-column lines, scroll, reverse screen, and the "Special Graphics" character set.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.46.xx

The LN01 FONT UTILITY is a utility program designed to aid in the management, development, and usage of fonts for the LN01 laser printer.

The utility provides a mechanism for:

- Editing existing and creating new LN01 fonts.
- Combining text with LN01 fonts in a manner suitable for printing on the LN01 Laser Printer.
- Obtaining information about a particular LN01 font.
- Obtaining sample output using specified LN01 fonts.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.35.xx

DECpage

DECpage is an ALL-IN-1 VAX/VMS application utilizing the LN01 laser printer to produce high quality output without the need for text mark-up or graphic arts skills. DECpage prints the following types of office documents:

- Memos and letters
- Reports
- Directories
- Newsletters
- Overhead transparencies

DECpage supports all DECdx-format word processing systems including DECmate I and II, WS78, WS200, and DECword.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.29.xx

MicroPower/Pascal-VMS

MicroPower/Pascal-VMS is a VAX/VMS layered product which belongs to the MicroPower/Pascal product family. MicroPower/Pascal is a modular executive and software development package for PDP-11 (Q-bus) based microcomputer applications. It includes software components needed to create, build and debug/test concurrent realtime application software running stand-alone on a target runtime microcomputer system.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.29.xx

The VAX PCL driver is an optional VAX/VMS software product that supports interprocessor communications via the PCL11 hardware option. The VAX PCL driver provides a message oriented data communications capability between user software located in up to 16 processors linked into a local area network by the PCL11 multidropped parallel bus. A user oriented message of variable length can be directed to any other single receiving node during each transmission transaction. Both VAX-11 AND PDP-11 processors can be mixed on the same PCL11 local network. The VAX PCL driver is compatible with the PCL-11M driver, version 2.0 and above, for the RSX-11M Operating System.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.23.xx

VAX GKS/Ob

VAX GKS/Ob (Graphical Kernel System) is a subroutine library packaged as a VAX/VMS sharable image, which implements the ISO and ANSI GKS standard for two dimensional (2D) device independent graphics. VAX GKS/Ob conforms to level Ob of the GKS standard which provides direct output (level 0) and synchronous input (level b) capabilities.

VAX GKS/Ob as a development tool that application programmers can use to produce computer generated pictures. Any VAX/VMS language that supports the VMS calling convention can call VAX GKS.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.20.xx

CMR21 Host Utility

The CMR 21 Host Utility is a library of RSX-11/VMS utility programs which serve as tools to assist users of CMR21 distributed industrial control processors in configuring and supporting networks of CMR21 units. Use of the utility is optional and is not a requirement for operation of the CMR21. However, in applications where large numbers of CMR21 processors are distributed over a wide area, the utility provides a convenient set of non-privileged executable tasks to determine a network configuration, and to access individual processors in the network. The CMR21 Host Utility is VAX/VMS and PDP-11RSX-11 compatible. It supports both mapped and unmapped memory configurations, and is distributed in Files-11 format.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

30.39.xx

VAX-11 DRE11-C Device Driver

The VAX-11 DRE11-C Device Driver supports the DRE11-C interface, which is a general purpose, parallel interface between the VAX/UNIBUS adapter (UBA) and a user's peripheral. The device performs Direct Memory Access (DMA) controlled block transfers of 16-bit data between a VAX-11 processor and an external device. Multiple blocks of data can be transferred without setting up new DMA parameters by means of hardware-controlled switching of alternate buffers in the processor's memory.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.17.xx

VAX MDE

VAX MDE is an in-circuit emulation development system for Micro T-11 16-bit microprocessors. VAX MDE offers features for observing, controlling, and simulating the hardware interface between the processor and external circuitry, without impacting the speed, performance, or operating environment of the Micro/T-11.

Support Category Consult the Software Product Description for installation and support information.

S.P.D. Number 25.87.xx

VAX DY32

VAX DY32 is a software package that provides local area network communications for VAX/VMS host systems. It allows user application programs in a VAX/VMS host to communicate with multidropped devices connected to the VAX/VMS host via the DECdataway.

Support Category Consult the Software Product Description for installation and support information.

S.P.D. Number 25.57.xx

VAX Driver for 11C03

The VAX Driver for 11C03 provides a DMA interface for up to eight serial line graphics terminals running on the VAX/VMS Operating System. It supports rapid image generation during interactive design sessions on compatible graphics terminals. The VAX Driver for 11C03 utilizes variable length block DMA transfers for output data to reduce the VAX-11 CPU loading imposed by high data rates to the serial lines.

Support Category Consult the Software Product Description for installation and support information.

S.P.D. Number 25.56.xx

FEPCM Software Tools Kit

The FEPCM Software Tools Kit is a package of software modules designed to assist a user in developing applications for the FEPCM front-end processor system. The modules included are:

- VMS Bridge Driver
- Front-end Bridge Driver
- Front-end Template I/O Driver
- Front-end Template User Task
- Downline Load Package

Support Category Consult the Software Product Description for installation and support information.

S.P.D. Number 25.51.xx

VAX-11 KCT32 is a software and firmware package that provides VAX/VMS support of the KCT32 hardware communication option. VAX-11 KCT32 software, in conjunction with the KCT32 firmware and KCT32 hardware allows the user to implement custom communication applications.

Users can program the KCT32 communication lines for bit/byte synchronous or asynchronous transmission and reception using the standard DIGITAL PDP-11 Instruction Set, as implemented with the DCT11 chip. This software used with the KCT32 hardware and user written communication application allows the VAX/VMS host processor to perform high speed (two lines at 64K bits per second or one line at 160K bits per second in bit sync mode) multiline communication functions.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.04.xx

VAX-11/780**Microprogramming Tools**

The VAX-11/780 Microprogramming Tools enable a programmer to assemble and load microprograms for the User Writable Control Store (UWCS) option of the VAX-11/780 central processor. The VAX 11/780 Microprogramming Tools operate under the VAX/VMS Operating System.

Support Category

Customer Supported/Customer Installed

S.P.D. Number

25.09.xx

VAX SPM

VAX SPM is a Software Performance Monitor which enables the user to collect and report performance statistics for VAX/VMS systems. General performance statistics can be collected on per-process basis.

Analysis of the performance reports provides information relevant to system tuning, avoidance of system bottlenecks, design and development of applications and system capacity planning.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

SO.16.xx

Courseware Design System

The Courseware Design System (C.D.S.) is a menu-driven system for developing computer-based instruction material. C.D.S. uses pre-defined video forms called "templates." A C.D.S. template is designed for use by an individual with no programming background. C.D.S. includes both pre-defined sample templates and the capability to create and modify templates.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.58.xx

VAX DEC/Shell

VAX DEC/Shell, running on VMS and MicroVMS, provides the same user interface found in the native UNIX★ Version 7, namely the Bourne Shell. VAX DEC/Shell is an alternative command line interpreter to DCL.

VAX DEC/Shell, along with VAX C, VAX DEC/CMS and VAX DEC/MMS, makes up the layered product set for VNX. A user interface similar to UNIX★ is provided.

VAX DEC/Shell allows for a tailorable user environment. It permits users to create commands for individualized routines that can be run in an interactive environment. Command lines and command files can be created which assign symbolic names, evaluate numerical and logical expressions, accept parameters, communicate with interactive users invoking Shell scripts, and perform conditional and branching logic.

The most commonly used UNIX★ utilities have been provided with DEC/Shell.

★UNIX is a trademark of AT&T Bell Laboratories

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.69.xx

VAX DEC/Test Manager

VAX DEC/Test Manager automates regression testing by executing user-supplied tests and automatically comparing the results with the expected test results. VAX DEC/Test Manager gives the software engineer flexibility in organizing tests and selecting tests for execution and in verifying and reviewing test results.

VAX Test Manager runs on VMS and is targeted for use by software engineers working on a wide range of software projects that can be tested in batch.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.68.xx

VAX-11 TSU05 Device Driver

The VAX-11 TSU05 Device Driver provides full support for the TSU05 Magnetic Tape Interface and Drive on VAX-11/730, 750 and 780 processors. It also provides full Error Logging Support and the ability to take advantage of the speed provided by the TSU05 subsystem.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.65.xx

IEC11-V Device Driver

The IEC11-V Device Driver allows programs written in MACRO-32, FORTRAN, or BASIC to communicate with IEEE Std.488 devices connected to the IEC11-A and IEC11-B. This communication is implemented through a choice of direct QIO calls to the executive or a set of subroutines callable from high-level languages.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

25.74.xx

The VAX Language-Sensitive Editor is a multi-language, multi-window, screen-oriented editor specifically designed for program development and maintenance. The Editor is "language sensitive" in that it provides users with VAX language-specific information. This information enables both new and experienced programmers to develop programs faster, with fewer errors, through VAX language-specific construct completion, and error detection and correction facilities. The VAX Language-Sensitive Editor works in concert with supported VAX languages and the VAX Symbolic Debugger to provide a highly interactive, on-line environment that facilitates the EDIT-COMPILE-DEBUG portion of the program development cycle. Within a single editing session, users can write code, edit, compile, review compile-time errors, and correct compile-time errors. The Editor can be invoked directly from the VAX Symbolic Debugger to correct source code errors found during a debugging session. Users can customize the environment by tailoring and expanding upon the features and structures provided by the VAX Language-Sensitive Editor.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.59.00

VAX Performance and Coverage Analyzer

The VAX Performance and Coverage Analyzer is a tool to help VMS and MicroVMS users analyze the execution behavior of their applications. programs. The VAX Performance and Coverage Analyzer has two functions. First, it can pinpoint execution bottlenecks and other performance problems in applications programs. Secondly, it provides test coverage analysis by measuring what parts of a user program are executed or not executed by a given set of test data.

The VAX Performance and Coverage Analyzer is an aid in tuning the performance and testing of application programs. It is not a tool for the analysis of operating system performance or for use as an aid in hardware resource planning.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.76.xx

VAX-11-RSX

VAX-11 RSX is an emulator of the RSX-11 operating system family which executes on VMS. It provides special capabilities which enable PDP-11 users to develop programs for execution in any of the following environments:

- VAX/VMS compatibility mode
- RSX-11M-PLUS
- RSX-11M
- RSX-11S
- Micro/Rsx
- P/OS

VAX RSX also allows for the migration of many existing RSX-11 applications to VAX/VMS.

Support Category

Consult the Software Product Description for installation and support information.

S.P.D. Number

26.73.xx

How to Use the Software Ordering Table

The following tables detail the most commonly ordered options for each Digital software product described in this section. For ordering purposes, every version of every product is assigned a 7-character code referred to as a "Q-number."

The letter "Q" begins every code excepting those for diagnostic software, which begin with a "Z." The second character of the order code signifies the VAX processor on which the software is to be run. VAX-11/730 software versions carry a "C" in this position, VAX-11/750 a "D," and an "E" is used for the VAX-11/780 series. One column for each of these processor choices is found in the table below.

The next three characters, those preceding the code's hyphen, comprise a software product's Unique Product Identifier. Any variation of VAX/VMS, for example, has a Unique Product Identifier of 001, regardless of license/support terms or medium on which it is supplied. The table's second column specifies each product's Unique Product Identifier.

The two characters after the hyphen complete the order code. The first of these signifies license and/or support terms for each variation; the second the distribution medium. Expressed together, they explain the various forms in which a given software product, for a given VAX CPU, can be ordered. Those variations are shown in the three CPU columns. See the software ordering table for an explanation of the meaning of each two-character designation.

Operating System Software Ordering Example

Purchasing a VAX system which includes the VAX/VMS License (Qx001-UZ), leaves the customer to decide the level of support required and the binaries and distribution media.

The minimum requirement with a first purchase is documentation and media. A customer purchasing a VAX-11/750 would go to the operating system line in the order code chart and looking in the Product Identifier Column start the order code with QD001, then move across to the VAX-11/750 options to find media and documentation options. If the media desired is 9-track magtape (-HM), the complete order code becomes QD001-HM.

Many customers purchasing their first VAX systems will require startup support. The customer needing support will go to the Systems Startup Services line in the order code chart and looking in the Product Identifier Column start the order code with QD001, then move across to the VAX-11/750 options to find the System Startup Service option most suited to their needs. If the media desired is 9-track magtape, and the customer needed Installation/Orientation and Training (System Startup Service Level II, SSS II), the complete order code becomes QD001-7M. Documentation and media must still be ordered (QD001-HM), however there is no charge.

Dependent Software Ordering Example

A customer owning a VAX-11/750 system wishes to order and install VAX DATATRIEVE. First, check the summary description for minimum system requirements and any prerequisites (e.g. VAX Common Data Dictionary). The customer is also advised to consult the S.P.D. (Software Product Description) for a more detailed treatment of the product in question.

Then, looking across the row in the ordering table for VAX DATATRIEVE, he finds the Unique Product Identifier to be 898. With the letter "D" in the second position indicating VAX-11/750 (see heading for VAX-11/750 column), his order code will begin with QD898. The VAX-11/750 column then shows the two-character codes representing the various license/support terms and the distribution media available. At this point the customer refers to the explanations of these two-character codes, immediately following the table. For a single-use license, binaries, and documentation, the customer orders the license QD898-UZ and then, if it is a first purchase of the product, a choice is made between 9-track magtape (-HM) or RK07 disk cartridge (-HV) as the distribution media. Owning a TU77 tape subsystem and no RK07, this hypothetical customer's complete order code becomes QD898-HM. If it is the customer's second or subsequent purchase of QD898-UZ, VAX DATATRIEVE, the purchase of binaries and documentation is optional.

The customer might also wish to order additional related VAX DATATRIEVE product(s), such as a software documentation kit. The same box in the table, (VAX DATATRIEVE row, VAX-11/750 column), confirms that such a kit is available. The two-character suffix for a software documentation kit is "-GZ," its complete order code is therefore QD898-GZ.

Q **X** **X** **X** **X** - **1** **2**

1—License and Service

1 = Additional Dispatch Subscription	I = Installation Service for Software
2 = Dispatch Subscription Service (PDP-8)	J = Monthly Rental Support Service
3 = Self-Maintenance Service for Software	K = Additional Subscription/Maintenance Service
4 = Source Update Service	L = Sources update
5 = System Start-Up Service Package Level I	M = Sources license, sources & microfiche listings, documentation
6 = Additional Telephone Support Center Contact	N = Sources or sources and binaries documentation, license required
7 = System Start-Up Service Package Level II	P = Binaries, no license required
8 = Basic Service for Software	Q = Single-Use license for VAXcluster system, warranty
9 = DECsupport Service for Software	R = Binaries, documentation, no license, no support services
A = Single-use license, binaries, documentation, warranty w/support services	S = Professional Software Services (consulting)
B = System Start-Up Service Package Level III	T = Single-Use license, supplementary software
C = Single-use license, binaries, documentation	U = Single-Use license, warranty
D = Single-Use license	X = Single-use sources license, sources or sources and binaries, documentation, warranty w/support services
E = Sources license, sources	Y = Single-use sources license, sources or sources and binaries, documentation
F = Sources license, listings	Z = Maintenance Service
G = Documentation-only	
H = Binaries and documentation license required	

2—Media

2 = RX18 Floppy Diskette	P = 9-track 800 BPI Magtape (NRZI)
3 = RX50 Floppy Diskette	Q = RL01 Disk Cartridge
4 = RC25 Disk Cartridge	R = Microfiche
A = 6250 BPI 9-Track Magtape	S = ROM Chip
D = 9-track 800 BPI Magtape (NRZI)	T = RK06 Disk Cartridge
G = TU58 DECTape II Cartridge	V = RX07 Disk Cartridge
H = RL02 Disk Cartridge	X = RX02 Double Density Diskette
J = RA60 Disk Cartridge	Y = RX01 Floppy Diskette
M = 9-track 1600 BPI Magtape (PE)	Z = No hardware dependency

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx-xx-xx)	VAX 8600 Options (QKxxx-xx)	VAX-11/780 Series Options (QExxx-xx)	VAX-11/750 Options (QDxxx-xx)	VAX-11/730 Options (QCxxx-xx)	VAX-11/725 Options (QCxxx-xx)	MicroVAX Options (QNxxx-xx)
Operating System VAX/VMS 25.01.xx	001		-HM, -HJ, -UZ, -FR, -GZ, -MM	-HH, -HM, -HJ, -FR, -GZ, -MM, -UZ	-HH, -UZ, -FR, -MM	-UZ, -H4, -HH, -HJ, -HM, -HZ, -GZ	-UZ
Optimum Startup Service Packages* VAX/VMS 25.01.xx	001		5J, -5M, -7J, -7M, -BJ, -BM, -BV	-5H, -5J, -5M, -7H, -7J, -7M, -BH, -BJ, -BM, -BV	-5H, -7H, -BH	-54, -5H, -5J, -5M, -74, -7H, -7J, -7M, -B4, -BH, -BJ, -BM	QN1002-53 QN1002-73 QN1002-B3
VAX APL 25.31.xx	020	-UZ, -QZ	-HY, -UZ, -QZ, -HZ, -GZ	-HG, -UZ, -QZ, -HZ, -GZ	-GZ, -UZ, -QZ, -H4, -HZ		
VAX BASIC 25.36.xx	095	-UZ, -QZ	-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ	-UZ, -HG, -HZ, -GZ	-UZ, -HZ, -H3
VAX BLISS-16 25.19.xx	014		-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ		
VAX BLISS-32 25.12.xx	106	-UZ, -QZ	-GZ, -UZ, -HG, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -UZ, -QZ, -H4, -HZ		
VAX C 25.38.xx	015	-UZ	-GZ, -HY, -UZ, -QZ, -HM, -HZ	-GZ, -HG, -UZ, -QZ, -Hm, -HZ	-GZ, -HG, -UZ, -HM, -HZ	-UZ, -DZ, -HG, -HM, -HZ, -GZ	-UZ, -HZ, -H3
VAX COBOL 25.04.xx	099	-QZ	-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ	-UZ, -NG, -HZ, -GZ	
VAX CORAL 66 25.37.xx	067		-HY, -UZ	-HG, -UZ	-HG, -UZ		
CORAL 66/VAX to RSX Cross Compiler 25.69.xx	075		-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ		
VAX DIBOL 25.49.xx	018	-QZ	-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ	-UZ, -HG, -HZ, -GZ	-UZ, -HZ, -H3
VAX FORTRAN 25.16.xx	100	-UZ	-EM, -GZ, -HY, -UZ, -QZ, -HZ	-EM, -GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ	-UZ, -HG, -HZ, -GZ	-UZ, -HZ, -H3
VAX PASCAL 25.11.xx	126	-UZ, -QZ	-EM, -GZ, -HY, -UZ, -QZ, -HM, -HZ	-EM, -GZ, -HG, -UZ, -QZ, -HM, -HZ	-EM, -GZ, -HG, -UZ, -HM, -HZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HZ, -H3
VAX PL/1 25.30.xx	114	-UZ, -QZ	-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ	-UZ, -HG, -HZ, -GZ	-UZ, -HZ, -H3
FORTRAN IV/VAX-to-RSX Cross Compiler 25.17.xx	107		-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -UZ, -QZ, -H4, -HZ		
VAX RPG11 25.05.xx	631	-UZ, -QZ	-UZ, -QZ, -HM, -HY, -HZ, -GZ	-UZ, -QZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	
VAX LISP 25.82.xx	917	-UZ, -QZ	-UZ, -QZ, -HJ, -HM, -HV, -HZ, -GZ	-UZ, -QZ, -HH, -HJ, -HM, -HV, -HZ, -CZ	-UZ, -HH, -H5, -HZ, -QZ		
VAX ADA 26.60.xx	056	-UZ, -QZ, -HM, -HZ, -GZ	-UZ, -QZ, -HJ, -HM, -HV, -HZ, -GZ	-UZ, -QZ, -HH, -HJ, -HM, -HV, -HZ, -GZ	-UZ, -HH, -HJ, -HM, -HZ, -GZ		-UZ, -H3, -HZ, -GZ

*5 = Optimum 1

7 = Optimum 2

B = Optimum 3

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx-xx)	VAX 8600 Options (QKxxx-xx)	VAX-11/780 Series Options (QExxx-xx)	VAX-11/750 Options (QDxxx-xx)	VAX-11/730 Options (QCxxx-xx)	VAX-11/725 Options (QCxxx-xx)	MicroVAX Options (QNxxx-xx)
DECnet-VAX 25.03.xx	D05		-HY, -UZ, QZ, -HZ	-HG, -UZ, -QZ, -HZ	-UZ, -HG, -HZ	-UZ, -HG, -HZ	-UZ, -HZ, -H3
DECnet Router/x.25 Gateway 30.41.xx	727		-UZ, -HM, -HZ, -GZ	-UZ, -HZ, -GZ, -Hx	-UZ, -HZ, -GZ, -Hx		
DECnet/SNA Gateway 30.15.xx	545	-QZ	-UZ, -QZ, -HM, -HH, -HZ, -GZ	-UZ, -QZ, -HH, -HN, -HZ, -GZ	-UZ, -HG, -HZ, -GZ	-UZ, -HG, -HZ, -GZ	
DX/VMS, WPS-8 to 25.25.xx	707		-YY, -DZ	-YG, -DZ	-YG, -DZ		
MUX200/VAX 25.02.xx	070		-HY, -UZ, -QZ, -HZ	-HG, -UZ, -QZ, -HZ	N/A		
VAX PSI 25.40.xx	071		-GZ, -HY, -UZ, -HZ, -HM	-GZ, -HG, -UZ, -HZ, -HM	-GZ, -UZ, -HG, -HZ, -HM	-UZ, -GZ, -HG, -HZ, -HM	
VAX 2780/3780 Protocol Emulator 25.07.xx	111	-QZ	-EM, -FR, -GZ, -QZ, -HY, -UZ, -HZ	-EM, -FR, -GZ, -QZ, -HG, -UZ	-EH, -FR, -GZ, -HZ, -HG, -UZ		
VAX 3271 Protocol Emulator 25.21.xx	112	-UZ, -QZ	-EM, -FR, -GZ, -QZ, -HY, -UZ, -HM, -HZ	-EM, -FR, -GZ, -QZ, -HG, -UZ, -HM, -HZ	-EM, -FR, -GZ, -HG, -UZ, -HZ		
KMS11 x .25 Link Level Software 25.80.xx	757		-AY, -DZ, -GZ, -HY, -HZ	-AG, -DZ, -HG, -HZ, -GZ	-AG, -DZ, -HG, -HZ, -GZ		
Ethernet Terminal Server 30.35.xx	726		-UZ, -HM, -H4, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -QZ	-UZ, -HG, -HM, -HZ, -GZ	

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx---xx)	VAX 8600 Options (QKxxx-_-)	VAX-11/780 Series Options (QExxx-_-)	VAX-11/750 Options (QDxxx-_-)	VAX-11/730 Options (QCxxx-_-)	VAX-11/725 Options (QCxxx-_-)	MicroVAX Options (QNxxx-_-)
DEC/CMS 25.52.xx	007	-UZ, -QZ	-HY, -UZ, -GZ, -QZ, -HZ	-HG, -UZ, -GZ, -QZ, -HZ	-HG, -UZ, -GZ, -HZ, -HM		
VAX ADE 25.76.xx	425		-HY, -UZ, -GZ, -QZ, -HM, -HZ	-HG, -UZ, -GZ, -QZ, -HM, -HZ	-HG, -UZ, -GZ, -HM, -HZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HZ, -H3
VAX ALL-IN-1 Office Menu 25.85.xx	902		-HM, -HJ, -UZ, -GZ, -QZ, -HV, -HZ	-HM, -HJ, -UZ, -GZ, -QZ, -HV, -HZ	-HH, -UZ, -GZ, -HJ, -HM, -HZ		
VAX DECmail 25.64.xx	400		-HJ, -UZ, -GZ, -QZ, -HM, -HV, -HZ	-HH, -HM, -HJ, -UZ, -GZ, -QZ, -HV, -HZ	-HH, -UZ, -HZ, -GZ		
VAX FMS 26.10.xx	800	-UZ, -QZ	-HY, -HZ, -UZ, -QZ, -HM, -GZ	-HG, -HZ, -UZ, -QZ, -HM, -GZ	-GZ, -HG, -UZ, -HH, -HZ	-UZ, -HG, -HH, -HZ, -GZ	-UZ, -HZ, -H3
VAX ReGIS Graphics Library (RGL) 25.62.xx	118		-HY, -UZ, -QZ, -HZ	-HG, -UZ, -QZ, -HZ	-HG, -UZ, -HZ		
VAX DT07 25.88.xx	S32		-XY, -NY, -DZ, -NZ, -GZ	-NG, -GZ, -XG, -DZ, -NZ	-NG, -QZ, -XG, -DZ, -NZ		
VAX-11/780 Microprogramming Tools 25.09.xx	109		-DZ, -QZ, -HY				
VS11 VAX Driver 25.45.xx	S28		-GZ, -XY	-GZ, -XG	-GZ, -XG		
VAX Module Management System 26.03.xx	500	-UZ	-HY, -UZ, -QZ, -HZ, -GZ	-HG, -UZ, -QZ, -HZ, -GZ	-HG, -UZ, -HZ, -GZ		
VAX Station Display Services 25.90.xx	434		-UZ, -QZ, -HJ, -HM, -HV, -HZ, -GZ	-UZ, -QZ, -HH, -HJ, -HM, -HV, -HZ, -GZ	-UZ, -H4, -HH, -HJ, -HM, -HZ, -GZ	-UZ, -H4, -HH, -HJ, -HM, -HZ, -GZ	
VAXELN Toolkit 28.02.xx	375						-UZ, -HZ, -H3
VAX KMS11 BD/BE 26.55.xx	920		-AM, -A4, -DZ, -GZ	-AG, -AM, -DZ, -GZ	-AG, -AM, -DZ, -GZ		
VAX TSU05 Device Driver 26.65.xx	615		-AM, -DZ, -HM, -HZ, -GZ	-AM, -DZ, -HM, -HZ, -GZ	-AM, -DZ, -HM, -HZ, -GZ		
DEC/TEST Manager 26.68.xx	927		-UZ, -QZ, -H4, -HM, -HZ, -GZ	-UZ, -QZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HZ, -GZ
VAX KCT32 26.04.xx	128		-AM, -A4, -DZ, -GZ	AG, -AM, -DZ, -GZ	-AG, -AM, -DZ, -GZ		
DECshell 26.69.xx	143		-UZ, -QZ	-UZ, -QZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -H3, -HZ, -GZ
VAX Performance and Coverage Analyzer 26.76.xx	119	-UZ, -QZ, -HM, -HZ, -GZ	-UZ, -QZ, -H4, -HM, -HZ, -GZ	-UZ, -QZ, -HG, -HM, -HZ, -QZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HZ, -GZ, -H3

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx-xx)	VAX 8600 Options (QKxxx-xx)	VAX-11/780 Series Options (QExxx-xx)	VAX-11/750 Options (QDxxx-xx)	VAX-11/730 Options (QCxxx-xx)	VAX-11/725 Options (QCxxx-xx)	MicroVAX Options (QNxxx-xx)
VAX DECOR 25.05.xx	451		-HY, -HZ, -GZ, -UZ, -QZ	-HG, -HZ, -GZ, -UZ, -QZ	-HG, -HZ, -GZ, -UZ		-UZ, -HZ, -H3
DECspell 26.34 Verifier/Corrector	650	-UZ, -QZ	-QZ, -HZ, -HY, -UZ	-QZ, -HZ, -HG, -UZ	-HG, -UZ, -HZ		
Verifier	652		-HY, -UZ, -QZ, -HZ	-HG, -UZ, -QZ, -HZ	-HG, -UZ, -HZ		
Correction Option	654		-HY, -UZ, -QZ, -HZ	-HG, -UZ, -QZ, -HZ	-HG, -UZ		
Additional Lexicon	655		-HY, -DZ, -QZ	-HG, -DZ, -QZ	-HG, -DZ		
VAX DECgraph 26.07.xx	360	-UZ, -QZ	-HY, -UZ, -GZ, -QZ, -HM, -HZ	-GZ, -HG, -UZ, -QZ, -HM, -HZ	-HG, -UZ, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	
VAX DECslide 26.11.xx	361	-UZ, -QZ	-GZ, -HY, -UZ, -QZ, -HM, -HZ	-QZ, -HG, -UZ, -HM, -HZ, -GZ	-HM, -HG, -UZ, -HZ, -GZ		
VAX DECtype 26.56.xx	038		-UZ, -HY, -HZ, -GZ	-UZ, -HG, -HZ, -GZ	-UZ, -HG, -HZ, -GZ		-UZ, -HZ, -H3
VAX Rdb/VMS 25.59.xx	354	-UZ, -QZ	-HM, -HV, -HJ, -UZ, -QZ, -HZ, -GZ	-HM, -HV, -HH, -UZ, -HJ, -QZ, -HZ, -GZ	-UZ, -HH, -HJ, -HZ, -HM, -GZ	-UZ, -H4, -HZ, -CZ	
VAX Rdb/ELN 28.03.xx	D07		-HM, -HV, -HJ, -GZ, -UZ, -QZ, -HZ	-HH, -HM, -HV, -QZ, -HJ, -UZ, -DZ, -HZ, -GZ	-HH, -UZ, -DZ, -HH, -HZ, -GZ	-UZ, -DZ, -HZ, -GZ, -H4	
VAX VTX 26.57.xx	031	-UZ, -QZ	-HM, -AY, -HY, -DZ, -HZ, -QZ, -UZ	-HG, -HM, -HZ, -DZ, -QZ, -UZ	-HG, -HM, -UZ, -HZ	-UZ, -HG, -HM, -HZ	-UZ, -HZ, -H3
VAX SIM 26.62.xx	060		-HM, -HG, -HY, -QZ, -UZ, -GZ	-HM, -HG, -HY, -QZ, -UZ, -GZ			

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx---xx)	VAX 8600 Options (QKxxx-_-)	VAX-11/780 Series Options (QExxx-_-)	VAX-11/750 Options (QDxxx-_-)	VAX-11/730 Options (QCxxx-_-)	VAX-11/725 Options (QCxxx-_-)	MicroVAX Options (QNxxx-_-)
MICRO Power/Pascal-VMS 26.24.xx	029		-UZ, -HM, -HV, -HZ, -GZ	-UZ, -HH, -HM, -HV, -HZ, -GZ	-UZ, -HH, -HZ, -GZ		
ReGIS Software 26.15.xx	204		-UZ, -QZ, -HY, -HZ	-UZ, -QZ, -HG, -HZ	-UZ, -HG, -HZ		
Polygrafix 26.14.xx	211		-UZ, -QZ, -HY, -HZ, -GZ	-UZ, -QZ, -HG, -HZ, -GZ	-UZ, -HG, -HZ, -GZ	-UZ, -HG, -HZ, -GZ	
DRX11-CLVMS Driver 26.64.xx	S36		-DZ, -GZ	-DZ, -GZ	-DZ, -GZ		
LAT-11 15.32.xx	QR335-HG, -HX, -HZ, -GZ, -UZ						

Software Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx---xx)	VAX 8600 Options (QKxxx-_-)	VAX-11/780 Series Options (QExxx-_-)	VAX-11/750 Options (QDxxx-_-)	VAX-11/730 Options (QCxxx-_-)	VAX-11/725 Options (QCxxx-_-)	MicroVAX Options (QNxxx-_-)
VAX-Common Data Dictionary 25.53.xx	897	-UZ, -QZ	-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ		-UZ, -HZ, -H3
VAX DATATRIEVE 25.44.xx	898	-UZ, -QZ	-HH, -GZ, -HM, -HZ, -HG, -UZ	-QZ, -GZ, -HH, -HM, -HJ, -UZ, -HV, -HZ	-HV, -GZ, -UZ, -HZ, -QZ, -HJ, -HM		
VAX TDMS 25.71.xx	706	-QZ	-HM, -HJ, -UZ, -QZ, -GZ, -HV, -HZ	-HH, -HM, -HJ, -UZ, -QZ, -HV, -HZ, -GZ	-HH, -UZ, -HJ, -HZ, -GZ		
VAX DBMS 25.48.xx	899	-UZ	-GZ, -HM, -HV, -UZ, -QZ, -HJ, -HZ	-GZ, -HH, -HM, -HJ, -UZ, -QZ, -HV, -HZ	-GZ, -HH, -UZ, -HJ, -HZ		
VAX DSM 25.08.xx	130		-GZ, -HY, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -QZ, -HZ	-GZ, -HG, -UZ, -HZ		
VAX ACMS 25.50.02	76	-UZ, -QZ	-GZ, -HZ, -HM, -HJ, -HH, -UZ	-GZ, -HZ, -HV, -HM, -HJ, -HH, -QZ, -UZ	-GZ, -HZ, -HM, -HJ, -HH, -UZ		
VAX x.25/x.29 Extension Package 26.43.xx	728		-UZ, -HY, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ	-UZ, -HG, -HM, -HZ, -GZ		

The ULTRIX-32 System is Digital's supported native UNIXTM operating system for Digital's VAX hardware. ULTRIX-32 software provides complete UNIX system functionality enhanced especially for Digital's VAX virtual memory computers. ULTRIX-32 software is an interactive, time-sharing operating system derived from the Fourth Berkeley Software Distribution (4BSD) technology developed at the University of California at Berkeley.

ULTRIX-32 software takes advantage of the VAX virtual memory architecture with demand paging and provides enhanced performance for applications requiring large amounts of memory.

In addition to features and performance comparable to 4BSD, Version 4.2m ULTRIX-32 provides the following benefits:

- Enhanced functionality and device support
- Serviceability enhancements
- Reliability features
- Improved technical documentation
- Ability to install and tailor the system kernel for specific configurations without the need for sources
- Support for VAX-11/785, VAX-11/780, VAX-11/750, VAX-11/730 and VAX-11/725 systems

Some of the more familiar UNIX system tools for software development and text processing provided by the ULTRIX-32 system include:

- UNIX Version 7 Bourne and C Shells
- Line and screen editors
- File Transfer capability (UUCP)
- Ethernet Support
- TCP/IP and DECnet-ULTRIX Support
- Remote Login
- Remote job execution
- Electronic mail
- Text processing utilities
- Programming Languages—C, FORTRAN 77, PASCAL, FranzLISP, UNIX Assembler, Modula 2
- Database Facilities
- Source Code Management Systems

The ULTRIX-32m System combines Digital's proven UNIX software, ULTRIX-32, with the MicroVAX II -the new compact, cost-effective addition to the VAX family.

Along with the powerful, flexible UNIX functionality, ULTRIX-32m Version 1.1 offers a variety of special features. The most important addition in V 1.1 is kernel configuring capability. That is, V 1.1 allows you to add and remove device drivers to match your hardware configuration. This saves disk storage and greatly increases ULTRIX-32m versatility by allowing you to augment the operating system.

The combination of ULTRIX-32m software and MicroVAX II hardware brings powerful, industry-accepted VAX virtual memory architecture to a new level of users. This architecture enables programs requiring large amounts of memory to perform very efficiently with ULTRIX-32m software on MicroVAX hardware.

Ordering ULTRIX-32 Software

The basic ULTRIX-32 binary licenses included in the Replacement Packages, ULTRIX-32 SBBs and Packaged systems, provide for a pre-configured login user limit sized to the generally expected customer usage for the various VAX processor models. The login user capacity maximum is 16 users for the VAX-11/730, and 32 users for the VAX-11/750 and VAX-11/780. The login user limit may be extended (for a VAX-11/750, VAX-11/780, or VAX-11/785 only) by placing an additional order for the ULTRIX-32 Capacity Upgrades. ULTRIX-32 Capacity Upgrades can be ordered at the time of purchase of the initial basic binary license or at any time after initial purchase.

An ULTRIX-32 Source Code Option, QX821-MM, is available (see SPD). An implementation of the Federal Data Encryption Standard (DES) is also available for ULTRIX-32 systems.

Customers with an existing VAX system with a VMS license which was installed prior to January 7, 1984, and who also obtained a UNIX license for that system from a third party prior to January 17, 1984, may take advantage of the special ULTRIX-32 UNIX Replacement Packages which include not only an ULTRIX-32 binary license, but also media, documentation and one year of Software Produce Services. An order for ULTRIX-32 UNIX Replacement Packages must be placed prior to December 31, 1985.

ULTRIX-32 Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx---xx)	VAX-11/780 Series Options (QExxx-_-)	VAX-11/750 Options (QDxxx-_-)	VAX-11/730 Options (QCxxx-_-)	VAX-11/725 Options (QCxxx-_-)
ULTRIX-32 Maximum 16-user Binary License Only SPD 26.40.xx	821			-UZ	-UZ
ULTRIX-32 Maximum 32-user Binary License Only SPD 26.40.xx	821	-UZ	-UZ		
Optimum Startup Service Packages* ULTRIX-32 SPD 26.40.xx	821	5M, 5J, 5V, 7M, 7J, 7V, BJ, BM, BV	5M, 5H, 5J, 5V, 7M, 7H, 7J, 7V, BM, BH, BJ, BV	5M, 5H, 7M, 7H, BM, BH	54 BM 74 BH B4
ULTRIX-32 Media and Documentation Kit SPD 26.40.xx	821	HM, HJ, HV	HM, HH, HJ, HV	HM, HH	H4
ULTRIX-32 User Capacity Upgrade from Maximum of 32 to maximum of 64 users SPD 26.40.xx	822	-UZ	-UZ		
ULTRIX-32 Media and Documentation Kit for the upgrade options SPD 26.40.xx	822	HY	HG		
ULTRIX-32 User Capacity Upgrade from Maximum of 64 to maximum of 65+ users SPD 26.40.xx	823	-UZ			
ULTRIX-32 Media and Documentation Kit for the upgrade options SPD 26.40.xx	823	HY			
ULTRIX-32 User Capacity Upgrade from Maximum of 32 to maximum of 65+ users SPD 26.40.xx	824	-UZ			
ULTRIX-32 Media and Documentation Kit for the upgrade options SPD 26.40.xx	824	HY			

*5 = Optimum 1

7 = Optimum 2

B = Optimum 3

ULTRIX-32 Ordering Information

Software Product S.P.D. Number	Product Identifier (Qx-xx)	VAX-11/780 Series Options (QExxx-xx)	VAX-11/750 Options (QDxxx-xx)	VAX-11/730 Options (QCxxx-xx)	VAX-11/725 Options (QCxxx-xx)
ULTRIX-32 Encryption License SPD 26.40.xx	825	-UZ	-UZ	-UZ	-UZ
ULTRIX-32 Media and Documentation Kit for Encryption options SPD 26.40.xx	825	HY	HG	HG	HG
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 16-User Binary License SPD 26.40.xx Includes media documentation, and One-year Self-maintenance Service	827			-SM, -SH	
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 32-User Binary License SPD 26.40.xx Includes media documentation, and One-year Self-maintenance Service	827	-SM, -SJ, -SV	-SM, -SH, -SJ, -SV		
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 16-User Binary License SPD 26.40.xx Includes media documentation, and One-year Basic Service	828			-SM, -SH	
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 32-User Binary License SPD 26.40.xx Includes media documentation, and One-year Basic Service	828	-SM, -SJ, -SV	-SM, -SH, -SJ, -SV		
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 16-User Binary License SPD 26.40.xx Includes One-year Right-to-copy Service	829			-SZ	
ULTRIX-32 UNIX Replacement Package ULTRIX-32 Maximum 32-User Binary License SPD 26.40.xx Includes One-year Right-to-copy Service	829	-SZ	-SZ		

General Information

VAX diagnostic kits are available to support the maintenance of standard VAX CPUs and peripheral devices.

All licensed binary software, including subsequent updates, is furnished under Digital's standard terms and conditions of sale which provide that the software may be used only on the single CPU on which the software is first installed.

VAX CPU ownership is a prerequisite to purchase a licensed VAX diagnostic kit.

An initial license kit, ZXXXXX-CX, is required for the first VAX CPU to be maintained, using the diagnostic kit. This kit includes the single-use license and binaries on media.

A copy license, ZXXXXX-DZ, is required for each additional CPU to be maintained, using the diagnostic software previously obtained in the initial license kit, ZXXXXX-CX. No binaries are included.

Licensed VAX diagnostic kits support specific CPU models and are not interchangeable among the various VAX CPUs because of significant differences in those CPUs. Therefore, the first CPU of each model type requires an initial licensed kit, ZXXXXX-CX, and a copy license, ZXXXXX-DZ, for each additional CPU of the same model type to be maintained, using diagnostic software.

VAX micro- and macrodiagnostic programs are organized into distinct categories based upon function and provided in a single kit for each CPU model.

Microdiagnostics (extended) set—provide fault detection and isolation of hardware failures with the CPU and memory.

Macrodiagnostics (basic) set—provides functional level diagnostics for the CPU and standard peripheral devices.

VAX-11 Diagnostic Update Service

VAX diagnostic kits can be kept up-to-date effortlessly via the optional Update Service.

An annual subscription to the Update Service will automatically provide new or revised diagnostics upon release from VAX-11 diagnostic engineering (about every eight weeks).

Each update will include new or revised media components of a (licensed) VAX-11 diagnostic kit—it does not totally replace the original kit.

VAX 8600 Diagnostic Set

The VAX 8600 Diagnostic Set is a package of programs that allows users to maintain a VAX 8600 central processor unit (CPU) and standard VAX 8600 peripheral devices. The set includes micro- and macrodiagnostic programs which are required to fully support diagnosis of a VAX 8600 system. The microdiagnostic programs detect and isolate faults at the module level within the CPU, Floating Point, and memory. Microdiagnostic monitor and a number of test overlays achieve module level fault detection and isolation. Microdiagnostics are executable with the microdiagnostic monitor running in the VAX 8600 LS/11 console. The console disks provide storage for the microdiagnostic test overlays. Microdiagnostic tests are organized into a bootstrapping sequence for testing the console interface, data path hardware, SBI-Cache-Translation Buffer, I-stream Buffer, SBI, and Memory Controller, Arrays and Floating Point Accelerator (FPA). All detected faults result in error typeouts that indicate the smallest set of modules to which the program can isolate a failure.

The VAX11-785 Diagnostic Set is a package of programs that allows users to maintain a VAX-11/785 central processor unit (CPU) and standard VAX11-11/785 peripheral devices. The set includes micro- and macrodiagnostic programs which are required to fully support diagnosis of a VAX-11/785 system. The microdiagnostic programs detect and isolate faults at the module level within the CPU, Floating Point, and memory. Microdiagnostic monitor, and a number of test overlays achieve module level fault detection and isolation. Microdiagnostics are executable with the microdiagnostic monitor running in the VAX-11/785 LSI/11 console. The console disks provide storage for the microdiagnostic test overlays. Microdiagnostic tests are organized into a bootstrapping sequence for testing the console interface, data path hardware, SI-Cache-Translation Buffer, I-stream Buffer, SBI, and Memory Controller, Arrays and Floating Point Accelerator (FPA). All detected faults result in error typeouts that indicate the smallest set of modules to which the program can isolate a failure.

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.81.xx

Diagnostics

VAX-11/780

VAX-11/780 diagnostic programs are available to self-maintenance customers in the following kits:

D diagnostic Kit Order Codes

Option	Order Code
Single-use license, binaries on magtape media, no documentation, no support services. <i>Prerequisite:</i> Customer-owned VAX-11/780 CPU	ZE200-CM
Single-use license, binaries on floppy disk media, no documentation, no support services. <i>Prerequisite:</i> Customer-owned VAX-11/780 CPU	ZE200-CY
Single-use license, no binaries, no documentation, no support services. <i>Prerequisite:</i> ZE200-CY or ZE200-CM	ZE200-DZ
Annual update service, binaries on magtape media, no documentation, no support services. <i>Prerequisite:</i> ZE200-CM	ZE200-HM
Annual update service, binaries on RX01 and magtape media, no documentation, no support services. <i>Prerequisite:</i> ZE200-CW	ZE200-HW

VAX-11/750

The VAX-11/750 microdiagnostic software is unique whereas it is hardware dependent. A diagnostic module, L0006-YA, is required to load the microdiagnostic program into the VAX-11/750. VAX-11/750 Diagnostic programs are provided to self-maintenance customers in the following kits:

Support Category

Digital Supported/Customer Installed

S.P.D. Number

26.82.xx

Diagnostic Kit Order Codes

Option	Order Code
Single-use license, binaries on TU58 media, no documentation, no support services. <i>Prerequisite:</i> Customer-owned VAX-11/750 CPU and L0006-YA diagnostic module (to be ordered separately)	ZD201-CG
Single-use license, binaries on TU58 and magtape media, no documentation, no support services. <i>Prerequisite:</i> Customer-owned VAX-11/750 CPU and L0006-YA diagnostic module (to be ordered separately).	ZD201-CW
Single-use license, no binaries, no documentation, no support services. <i>Prerequisite:</i> ZD201-CG or ZD201-CW	ZD201-DZ
Annual Update Service, binaries on TU58 and magtape media, no documentation, no support services. <i>Prerequisite:</i> ZD201-CG	ZD201-HG
Annual Update Service, binaries on TU58 and magtape media, no documentation, no support services. <i>Prerequisite:</i> ZD201-CW	ZD201-HW
1. The VAX-11/750 Diagnostic Module, L0006-YA, must be ordered separately.	

VAX-11/730

VAX-11/730 Diagnostic programs are provided for self-maintenance customers in the following kits. VAX-11/730 micro and macro diagnostic software fully supports Customer Runnable Diagnostics (CRDs), on the VAX-11/730. The CRD feature is a simplified operator interface that sequentially runs the micro and macro diagnostic programs.

Diagnostic Kit Order Codes

Option	Order Code
Single-use license, binaries on TU58 or RL02 media, no documentation and no support services. <i>Prerequisite:</i> Customer-owned VAX-11/730	ZC200-W
Annual Update Service binaries on TU58 or RL02 media, no documentation, no support services. <i>Prerequisite:</i> ZC200-CW	ZC200-HW
Single-use license only, no binaries, no documentation, no support services. <i>Prerequisite:</i> ZC200-CW	ZC200-DZ

The following chart is intended to cross reference the replace part number for current kits:

Kit Description	Old Part Number	New Part Number
VAX-11/780	ZE014-CY, ZE100-CM	ZE200-CW
	ZE014-CY, ZE100-CY	ZE200-CY
	ZE014-DZ, ZE100-DZ	ZE200-DZ
VAX-11/750	KC750-FA (see note), ZD101-CG	ZD201-CG
	KC750-FB (see note), ZD101-DZ	ZD201-DZ
	ZE026-DZ, ZD101-DZ	ZD201-DZ
VAX-11/730	ZC100-CH	ZC200-CW

1. The VAX-11/750 Diagnostic Module, L0006-YA, that was previously included in the KC750-FA, -FB kits, must now be ordered separately.

Additional Services for VAX System Maintenance

Maintenance Documentation Service (MDS) is *essential* for all VAX customers implementing a self-maintenance program. The service provides hardware maintenance documentation as well as VAX diagnostics listing on microfiche (only available through Maintenance Documentation Service) which provides further diagnostic fault isolation from module to logic path and integrated circuit. VAX hardware modifications and system revision level changes are included in the VAX microfiche library. An update service is available that automatically reports the latest changes to the VAX system hardware and diagnostics as released from engineering. New or updated Diagnostic Listings are issued coincidentally to the release of new or update diagnostic media.

Note: Although diagnostics are automatically shipped with a system, they remain the property of Digital and are intended to be removed from the site with the expiration of the Digital Field Service Warranty or Contracts. Customers performing self-maintenance must place an order for the diagnostic they wish to use beyond the warranty period.

Sources and Source Listings

Sources and source listings are available on various media for several VAX software products, specifically those which show order code suffixes of “-EM,” “-FR” or “-MM” in the preceding software ordering table. For necessary detailed information about these options, please refer to the appropriate Software Product Descriptions.

VAX Software Documentation Kits

Documentation Kits contain reference manuals, user's guides, and other helpful instructional materials to facilitate the use of each software product. They are available for several VAX software products, specifically those which show order code suffixes of “-GZ” in the preceding software ordering table. For necessary detailed information about these options, please refer to the appropriate Software Product Descriptions.

VAX Hardware Documentation Kits

These kits provide VAX hardware manuals and engineering drawings presently available in hard copy. The kits listed pertain only to VAX-specific devices. For more detail regarding documentation kits for peripheral devices, contact Digital's Accessories and Supplies Group or your local Digital Sales Representative.

Documentation Kit Order Codes

Option	Order Code
VAX-11/780 CPU Documentation Kit	FB-KA780-00
VAX-11/780 Console Subsystem Documentation Kit	FB-KC780-00
DW780 UNIBUS Adapter Documentation Kit	FB-DW780-00
FP780 Floating Point Accelerator Documentation Kit	FB-FP780-00
MA780 Multiport Memory Documentation Kit	FB-MA780-00
MS780 Memory Documentation Kit	FB-MS780-00
VAX-11/780 MASSBUS Adapter Documentation Kit	FB-RH780-00
VAX-11/750 CPU Documentation Kit	FB-KA750-00
MS750 Memory Documentation Kit	FB-MS750-00

1. Source and/or listing options are available only after the purchase of at least one supported license and after a source license agreement is in effect.

2. All VAX orders which include diagnostic listings will be license-checked by Order Processing prior to booking.

Software is the collection of written procedures and rules that control computer operations. The system software always includes an operating system, which is the "intelligence" of the computer system. Usually, the system software includes one or several language processors; it frequently includes specific applications as well.

As a set of organized programs, system software transforms your system hardware components into usable tools. These programs include operations, functions, and routines that assist you in solving problems and producing results. For example, some system programs store and retrieve data among the various peripheral devices. Others perform difficult or lengthy mathematical calculations. Some programs allow you to create, edit, and process application programs of your own. Still others handle entire applications for you.

The high degree of compatibility among PDP-11 programming languages, system programs, and information management services makes it easy to interconnect your organization's operations. Digital's network products can link together realtime, timesharing, and single-user systems. While a few of the characteristics of software may vary from application to application, compatibility helps guarantee that programs can move among systems with a minimum of trouble. For example, the FORTRAN-77 programming language runs on several operating systems. Consequently, a person who has learned it could, with little difficulty, write programs that would run in several operating-system environments. Likewise, a FORTRAN-77 application program can be readily transported to any Digital PDP-11 system that supports the FORTRAN-77 language.

A wealth of languages, utilities, and application software packages for PDP-11s is available, and the selection continues to grow. The *PDP-11 Software Source Book* lists thousands of application packages. These programs are available from Digital and from commercial developers who specialize in writing program packages for PDP-11 operating systems.

This section describes all of Digital's PDP-11 operating systems and software. Presented also are Digital application packages for data management, word processing, graphics, and applications development.

Product	Description
CTS-300	Multiuser extension of RT-11 for business applications using DIBOL-83
DSM-11	Multiuser timesharing for fast-access large-database applications on all PDP-11s
RSTS/E	General-purpose multiuser interactive timesharing for all PDP-11s
RSX-11M-PLUS	Superset of RSX-11M for larger memories, more advanced processors
RSX-11M	Small-to-moderate size realtime multiprogramming system
RSX-11S	Memory-resident execute-only downline-loadable subset of RSX-11M
Micro/RSX	Enhanced RSX-11M-PLUS subset, general purpose realtime, multiuser system for MICRO/PDP-11s
Micro/RSTS	General purpose multiuser interactive timesharing system for Micro/PDP-11s
Micro Power/ Pascal-RT	Modular operating system for developing realtime microcomputer applications
RT-11	Small, single-user, realtime multijob
ULTRIX-11	UNIX*-based General-purpose multiuser interactive timesharing for all PDP-11s

Product	Description
BASIC-PLUS-2	Block-structured interactive compiler for most DP applications
BASIC-11/RT-11	Interactive compiler for RT-11 systems
COBOL-81	Interactive compiler for business systems programming
CORAL-66	Block-structured language for realtime and process-control applications
DIBOL-83	Structured commercial applications language and utilities
FORTTRAN IV	Compiled language for scientific applications, small memory environments
FORTTRAN-77	Compiled language for file processing, scientific/engineering applications
PASCAL	Block-structured language for scientific/engineering applications

*UNIX is a trademark of AT&T Bell Laboratories

Applications Development Packages

ADE	Tool for non-programmers to develop simple business applications on RSTS
MENU-11	Package for creating customized menu-driven interfaces to RSTS/E systems
MicroPower/ Pascal-RSX	Modular operating system for developing realtime microcomputer applications
MicroPower/ Pascal-Micro/RXS	Modular operating system for developing realtime microcomputer applications
Professional Tool Kit	Package for developing Professional 300 Personal Computer applications
RTEM	RT emulator for RSX and VMS

Electronic Mail

DECmail-11	Full functionality electronic mail package for RSTS/E, Micro/RSTS, RSX-11M-PLUS and Micro/RXS
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Data Management Packages

INDENT	High performance commercial Forms development & package for RSTS and VMS
DATATRIEVE-11	Interactive database query/report writing system for non-computer professionals
FMS-11	Digital's standard Forms Management application development package
QUILL	Query/sorting/report generation system for non-computer professionals
SORT/MERGE	All-purpose data file sorting utility

Word Processing

DEtype	Word-processing for CTS-300, Micro/RXS, and RSX-11M-PLUS
DECword/DP	Word-processing for RSTS/E timesharing users

Graphics Packages

BCP	Interactive package for printing bar codes and block letters on the LXY1 2/LXY22 Graphics Lineprinters
DECgraph-11	Interactive business graphics package for RSTS/E
PLXY-11	Graphics application development package for LXY1 2/LXY22 Graphics Lineprinters
RGL	Graphics package for RT-11 and RSX-11M

An operating system is a collection of programs that manages a computer's hardware and software resources to provide efficient computer operation. The operating system organizes the central processor and its peripherals into useful tools for applications. Operating systems coordinate the execution of programs on the computer. They can also have a set of utilities and routines that manage such resources as printers and terminals, detect errors in programs, maintain user accounts, protect information, warn the operator of failures, and much more.

In general, an operating system is designed with a particular group of users in mind. Each operating system, therefore, acquires a unique set of characteristics reflecting the needs of such users. The basic distinction among PDP-11 operating systems is the processing method each system uses to execute tasks. The selection of an operating system will reflect the following processing options:

- Single-user vs. multiuser
- Single-job vs. foreground/background
- Foreground/background vs. multiprogramming
- Timesharing vs. event-driven multiprogramming
- Realtime

A single-user operating system receives demands upon its resources from a single user at a time. It has only to manage the resources based on these demands. As a result, single-user systems do not require account numbers to access the system or data files. Nor do these systems usually provide protection for user programs. RT-11 is a single-user operating system.

A multiuser operating system receives demands for its resources from more than one individual and/or program. The system must manage its resources based on these demands. For example, several users may want sole control of a device at the same time. The system handles access to the device. In addition, because people may be using the system for different purposes, privacy must be an option. As a result, a multiuser system normally has an account system to manage different users' files. The RSTS/E, Micro/RSTS, RSX-11M, ULTRIX-11, RSX-11M-PLUS, and Micro/RSX systems are multiuser systems.

The RT-11 operating system can operate in two modes: as a single-job system or as a foreground/background system. As a single-job system, one job at a time is executed in memory. As a foreground/background system, memory for user programs is divided into two separate regions. Two independent programs can reside in memory, one in the foreground region and one in the background region. The foreground region is occupied by a program requiring fast response to its demands and priority on all resources while it is processing. The foreground program executes until it relinquishes control to the background program. The background region is available for a low-priority program. The background program is allowed to execute until the foreground program again requires control. Thus, two programs effectively share the resources of the system. The basis of foreground/background processing is the sharing of a system's resources between two tasks. An extension of foreground/background and multiuser processing is multiprogramming. In multiprogrammed processing, many jobs compete for the system's resources.

The RSX-11 family of operating systems, which includes Micro/RSX, RSX-11M-PLUS, RSX-11M and RSX-11S, employs multiprogrammed processing based on a priority-ordered queue of programs demanding system resources. Memory is divided into several regions, called partitions. Program execution is event-driven based upon the priority of the tasks waiting for system resources. A task retains control of the CPU until it is interrupted by a higher-priority task or becomes unable to continue (for example, waiting for I/O or another resource). This family now includes Micro/RSX, designed for use on the Micro/PDP-11.

ULTRIX-11 is an enhanced version of AT&T's UNIX Time-Sharing System, Seventh Edition, which supports all Digital's peripherals.

The Seventh Edition UNIX system (V7), from which ULTRIX-11 is derived, is a general purpose, multiuser, interactive operating system. It features a hierarchical file system with demountable volumes; compatible file, device, and interprocess I/O; asynchronous processes; a system command language, selectable on a per-user basis; over 100 subsystems; and a high degree of portability among processors. Refer to *Seventh Edition UNIX Summary*, September 6, 1978, Bell Laboratories, Murray Hill, New Jersey, for a more detailed description of the Seventh Edition UNIX System.

All of the features in V7 are also in ULTRIX-11. In addition, ULTRIX-11 incorporates revisions made by Digital, designed to ensure maintainability and improve system performance.

The RSTS/E, Micro/RSTS, and DSM systems also perform concurrent execution of many independent jobs. RSTS/E, Micro/RSTS, and DSM, however, process jobs on a timesharing rather than an event-driven basis. Timesharing is another type of multiprogramming. In a timesharing environment, each task is guaranteed a certain amount of CPU time. Jobs receive time, one after another, in a round-robin fashion. The system manages timesharing processing to obtain the best overall response, depending generally on whether jobs are compute-intensive or I/O intensive. This type of processing is particularly suited for an interactive processing environment.

CTS-300 is a multiuser/multitask operating system that uses DIBOL-83 as a structured programming language for commercial applications.

Operating systems vary greatly in the kinds of hardware with which they are compatible, the range of complexity of tasks they handle, the degree of adaptability to special user purposes, and the programming languages which they support. PDP-11 computers run under a variety of operating systems. However, some applications run under only one operating system. Such applications require modification to run on other operating systems. It is important to consider what operating system(s) are required to use the desired applications.

The operating systems that run on PDP-11s offer various combinations of these processing environments. These systems are described in the following section.

Software Product Order Number	Single use License	PDP-11 General License*	System Startup Services	OSSP1	OSSP2	OSSP3	Distribu- tion and Documen- tation	Documen- tation only	DECsupport	Basic	Self- maintenance
MicroPower/Pascal-RT QJ029 SPD 19.12.xx	UZ						H3, HH, HX	GZ		83, 8H, 8X	33, 3H, 3X
MicroPower/Pascal-RSX QP029 SPD 14.83.xx	UZ						HD, HH, HM, HV	GZ		8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
Micro/RSX QY800 Base-level Kit SPD 14.28.xx							H3	GZ	93	83	33
Micro/RSX QY801 Advanced Programmers SPD 14.28.xx							H3		93	83	33
ULTRIX-11 QJ085 16 users Micro/PDP-11 only SPD 16.51.xx	UZ						H3	GZ	93	83	33
ULTRIX-11 QJ086 Maximum 9 users SPD 16.51.xx	UZ						HD, HH, HM	GZ	9D, 9H, 9M	8D, 8H, 8M	3D, 3H, 3M
ULTRIX-11 QJ087 Maximum 16 users SPD 16.51.xx	UZ						HD, HH, HM, H4	GZ	9D, 9H, 9M, 94	8D, 8H, 8M, 84	3D, 3H, 3M, 34
ULTRIX-11 QJ088 Maximum 32 users SPD 16.51.xx	UZ						HD, HM, H4	GZ	9D, 9M, 94	8D, 8M, 84	3D, 3M, 34
MICRO/RSTS COBOL-81 QY808 SPD 18.12.xx							H3	GZ			
Micro/RSTS QY829 SPD 18.12.xx							H3	GZ	93	83	33
Micro/RSTS Development QY830 SPD 18.12.xx							H3	GZ	93	83	33

*Consult the Software Product Descriptions (SPDs)

Software Product Order Number	Single use License	PDP-11 General License*	System Startup OSSP1	Services OSSP2	OSSP3	Distribu- tion and Documen- tation	Documen- tation only	DECsupport	Basic	Self- maintenance
RT-11 QJ013 SPD 12.1.xx	UZ	QJBxx- UZ	53, 5D, 5H, 5X	73, 7D, 7H, 7X	B3, BD, BH, BX	H3, HD, HH, HX	GZ	93, 9D, 9H, 9X	83, 8D, 8H, 8X	33, 3D, 3H, 3X
DSM-11 QJ821 SPD 12.18.xx	UZ	QJBxx- UZ				HD, HH, HM, HV	GZ	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
RSTS/E QR430 SPD 13.01.xx	UZ		5D, 5H, 5M, 5V	7D, 7H, 7M, 7V	BD, BH, BM, BV	HD, HH, HM, HV	GZ	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
RSX-11M-PLUS QR500 RK07 RA60/80/81, RM02/03/05/80 and RP04/05/06/07 based systems SPD 14.70.xx	UZ		5D, 5M, 5V	7D, 7M, 7V	BD, BM, BV	HD, HM, HV	GZ	9D, 9M, 9V	8D, 8M, 8V	3D, 3M, 3V
RSX-11M-PLUS QJ503 RL02 based systems SPD 14.70.xx	UZ	QJBxx- UZ	5H	7H	BH	HH	GZ	9H	8H	3H
RSX-11M QJ629 RK07 based systems SPD 14.35.xx	UZ		5D, 5M, 5V	7D, 7M, 7V	BD, BM, BV	HD, HM, HV	GZ	9D, 9M, 9V	8D, 8M, 8V	3D, 3M, 3V
RSX-11M QJ637 RP04/05/06/07 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	GZ	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ737 RM02/03/05/80 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	GZ	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ676 RA60/80/81 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	GZ	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ738 RL02 based systems SPD 14.35.xx	UZ		5D, 5H, 5M	7D, 7H, 7M	BD, BH, BM	HD, HH, HM	GZ	9D, 9H, 9M	8D, 8H, 8M	3D, 3H, 3M
RSX-11S QJ642 SPD 9.21.xx	UZ	QJBxx- UZ				HD, HH, HM, HV	GZ	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
CTS-300 QJ354 SPD 12.09.xx	UZ	QJBxx- UZ				HH, HV, HX	GZ	9H, 9V, 9X	8H, 8V, 8X	3H, 3V, 3X

Introduction

CTS-300 is a disk-based, single-user or multiuser software system that supports commercial applications on smaller PDP-11s. CTS-300 applications are written in DIBOL, the high-level Digital Business-Oriented, Language. The system consists of the RT-11 operating system, a choice of three runtime systems, Single-User DIBOL (SUD), Time-Shared DIBOL (TSD), Extended Memory TSD, and a number of utilities. Depending on the applications, program development can be done in a timesharing environment that supports a number of users or jobs simultaneously.

Some of the capabilities provided on CTS-300 are described below.

Run-Time Systems (RTS)

Single-User DIBOL allows one DIBOL user or job to be run on a system. It is designed for an entry-level system running in 32 Kbytes of memory. SUD runs on all RT-11 monitors (SJ, FB, XM).

Time-Shared DIBOL allows one or two users or two to four jobs to run simultaneously. It is designed for a medium-sized system running in 56 Kbytes of memory. File sharing facilities at the record level permit users to share and update the same data files. TSD is an executive that is usually run on the SJ monitor generated for multiterminal support.

Extended Memory TSD allows up to 12 DIBOL users or up to 16 DIBOL jobs to run simultaneously (up to 12 can be attached to terminals with the rest running in a detached environment). XMTSD is designed for larger systems running in 128 Kbytes to 248 Kbytes of memory. Using the XM monitor, XMTSD has the same features and capabilities found in TSD. In addition, XMTSD offers multiuser program development.

The CTS-300 programming editor, DKED, lets the user create and modify DIBOL programs online. Concurrent program development and application execution provide excellent flexibility. XMTSD runs in either the background or foreground. In the latter case, the background partition is available for program development.

The DIBOL Debugging Technique (DDT) allows DIBOL programs to be easily debugged with symbolic interaction, breakpoint, and traceback features.

Command Language

CTS-300 is designed for interactive use with keyboard commands that are consistent in format and easy to understand. The high-level command language simplifies transition from source code to execution code and also features indirect command files that permit the user to invoke a series of commands with a single command.

Data Management Services

Data Management Services (DMS) for CTS-300 provide capabilities for handling sequential, random, or indexed sequential access method (ISAM) structured files. Multivolume file support permits one file, extending over several disk drives, to be processed sequentially, randomly, or by indexed keyed access, without requiring special programming.

Introduction

The DSM-11 operating system is a multiuser data management system that consists of an interactive high-level programming language, Digital Standard MUMPS (Massachusetts General Hospital Utility Multiprogramming System), an extension of the American National Standard specification, a data management facility, and a timesharing executive.

Many users can access DSM-11 simultaneously and be relatively unaffected by the activities of other users. Because DSM-11 is an online program development and data storage and retrieval system, a programmer can rapidly write, test, debug, or modify a program and have a working application quickly established.

Digital Standard MUMPS is a high-level language oriented towards solving database problems. It can be used by programmers with relatively little programming experience. Implementation of the Digital Standard MUMPS language as an interpreter facilitates program development by eliminating the need to load editors, assemblers, and linkers.

The language's text-handling capabilities allow the inspection of any data item for content or for format. These capabilities are useful for online data entry checking and correction. Other text-handling capabilities include the ability to concatenate text strings and to segment text.

The DSM-11 hierarchical file structure allows users to design data file strategies to suit the needs of a particular processing environment. Dynamic file storage with variable-length string subscripts allows for easy modification or expansion of the database.

Owing to streamlined system installation and generation procedures, the DSM-11 system can be quickly adapted to any supported hardware configuration.

Other features of the DSM-11 operating system are:

- High-performance database handler using memory-resident cache of disk data for data sharing among users.
- Distributed database management implemented using DMC11/DMR11 high-speed data links.
- Online, high-speed database backup, disk media preparation and bad-block management, and tape-to-tape copying.
- Automatic powerfail-restart capability.
- Hardware-device error reporting, system patching utility, and executive debugger for system maintenance.

Introduction

The RSX-11M operating system is a multiuser, multiprogramming, realtime operating system designed for a variety of applications, including communications.

The event-driven and priority-structured scheduling mechanism allows the concurrent processing of realtime activities and less time-critical tasks. The system has 250 software priority levels, so a user can create, compile/assemble, debug, and install tasks without affecting realtime task response. When a high-priority event occurs, tasks with lower priority are swapped out of memory so that higher-priority tasks can be executed immediately.

The account structure, maintained by the system manager, provides system users with their own unique User Identification Code (UIC), password, directory for files, and a set of privileges for access to system commands and resources. Thus, both experienced and new users are able to execute all necessary tasks without jeopardizing others' work on the system.

RSX-11M also contains a number of features that let the user generate a working system easily and rapidly. The Autoconfigure task automatically determines the correct hardware configuration (including the processor type, the CSR and vector addresses of the peripheral hardware devices, and any optional hardware present) for the system on which SYSGEN is running. The Standard Function System option produces a mapped RSX-11M operating system with the maximum number of software options, including support for layered products, to eliminate responding to a long list of questions.

The following briefly summarize other features offered on RSX-11M.

Choice of Command Interface

All systems offer the traditional Monitor Console Routine (MCR) interface as well as the user-oriented, English-like Digital Command Language (DCL). Users also have the option to write their own Command Line Interpreters (CLIs) to suit their specific application.

Indirect Command Processor

An indirect command file created by a terminal user contains system commands that will be executed automatically by the system without further user intervention. Indirect command files save the user time and keystrokes by invoking repetitive or frequently used command procedures and system operations.

Programming Tools for RSX Operating Systems

Tasks can be written in MACRO-11 assembly language and in the following optional languages: FORTRAN-77, FORTRAN IV, FORTRAN-77 Debugger, SORT/MERGE, COBOL-81, BASIC-PLUS-2, DIBOL-83*, PASCAL, and CORAL 66. Sharable system libraries and user-created libraries are supported for easy access to commonly used system routines. To assist in program development, RSX-11M includes both the EDI line-oriented and EDT character-oriented text editors, utilities, symbol cross-reference program, interactive debugger, and task memory dump facilities. (Programming tools are not part of the operating system and must be purchased separately.)

*DIBOL-83 is available only on RSX-11M-PLUS and Micro/RSX (not on RSX-11M)

Data Management

The RSX-11M file system provides automatic space allocation and file structures for all data on block-structured devices. Features include file protection, volume protection, and logical device assignments. Multiheader file support enables file size to be limited only by the capacity of the volume on which it resides.

The Record Management System (RMS) allows relative, sequential, and multikey indexed file organizations (ISAM) and random, sequential, and record address access mode.

Memory Management

The RSX-11M executive can dynamically allocate available memory in system-controlled partitions. Effectively, this allows a task to be loaded anywhere in memory where there is room. When a task terminates, the space then becomes available for another task. Memory management provides the most efficient use of system memory, faster task execution, and hardware task protection.

Introduction

RSX-11M-PLUS is a high-performance superset of the RSX-11M operating system, designed to take advantage of the expanded addressing capability of today's larger-memory, instruction and data space, and PDP-11 architecture. RSX-11M-PLUS maintains the superior reliability and successful architecture of RSX-11M to ensure compatibility and ease of transition between systems. This realtime, multiprogramming, multiuser operating system offers the same features as RSX-11M and many others in addition to those listed below.

User Mode I/D Space

RSX-11M-PLUS supports separate instruction and data space. That means a user task has the ability to address up to 64 Kbytes of instruction and 64 Kbytes of data simultaneously, giving a 128-Kbyte total. I/D space simplifies the development and enhances performance of large application programs by reducing the need for program overlays.

Multistream Batch Processing

A powerful batch processing facility is provided on RSX-11M-PLUS in addition to the indirect command file processing capability. Batch processing is a means of automatically passing commands and data for processing by means of a virtual terminal. Batch-specific commands, MCR and DCL commands, and data are placed in a file and submitted to the system for execution at a designated time (usually at night when there are fewer demands on the system). Batch jobs do not require the physical presence of a user nor do they require a physical terminal to run. Batch processing uses a virtual terminal that emulates a complete interactive terminal session from logging on to logging off.

Accounting

For accounting purposes, the RSX-11M-PLUS system itself creates and maintains records on the use of system resources. These records are kept in an accounting log file. Accounting information is provided on users, the system, and every task running in the system. The system manager can use these accounting logs to establish programs for reporting on the use of system resources and for billing. Accounting also provides extensive performance information on mass-storage devices.

Message Router for RSX-11M-PLUS

Message Router for RSX-11M-PLUS is a store and forward message transport system that optimizes message delivery within a DECnet Phase III or Phase IV network. This product runs on a properly configured RSX-11M-PLUS operating system that supports a DECnet Phase III or Phase IV network. Message Router for RSX-11M-PLUS supports the existing Standard for Network Protocol, Interface, and Formatting being developed for Message Handling Systems by the National Bureau of standards (NBS). The Message Router for RSX-11M-PLUS software logs the progress of messages within the network and informs the sending application if undeliverable. Message Router for RSX-11M-PLUS requires application programs called User Agents or Gateways (UA/G) that will:

- Format and display messages
- Interact with Message Router for RSX-11M-PLUS in a "posting protocol" to send messages, or in a "delivery protocol" to receive messages.
- Convert received message from Message Router for RSX-11M-PLUS standard format into the required application.
- Convert a sending application format into the message router standard format.

Documentation to guide the user in developing User Agents/Gateways is included.

Any valid RSX-11M-PLUS system configuration that supports a DECnet-11M-PLUS Phase III or IV Network with at least 2,100 blocks of disk space and 31 Kwords of memory is required for Message Router software. (Additional requirements are dependent upon user's system application.)

Both the Message Router and DECnet software must be installed on all nodes that will be used to initially send or ultimately receive messages. In addition, it is recommended that Message Router be installed on any node that is part of the routing scheme.

SPD Number 14.29.xx

Introduction

The RSX-11S operating system is a memory-based subset of the RSX-11M operating system. It provides a runtime environment for execution of tasks on a memory-based processor. Memory-resident application programs require the support of a disk-based host system like RSX-11M, RSX-11M-PLUS, or VAX/VMS for program development.

RSX-11S has most of the RSX-11M features and generation capability, and supports all of the peripheral devices that are supported under RSX-11M.

Features

- Monitor Console Routine
- Online Task Loader
- System Image Preservation Program
- File Control Services for record devices

Introduction

Micro/R SX is an extended subset of the multiuser, multi-tasking RSX-11M-PLUS operating system. Micro/R SX is an RX50 distribution and repackaging specifically designed for the Micro/PDP-11. Micro/R SX is customer-installable (in less than one hour), and presysgenned and offers DCL and user-written CLIs. Micro/R SX supports up to 10 users, depending on the applications, and 14 terminals. Micro/R SX will run most RSX programs with little modification. Micro/R SX is divided into two packages.

Base Kit

The base kit provides the full RSX-11M-PLUS executive, appropriate utilities, device drivers, and support for user-mode program development with high-level languages. The base kit has complete tutorial and technical documentation. Customers who wish to program in high-level languages need only buy the base kit and the appropriate Micro/R SX language kit. RMS and EDT are included in the base kit. The base kit uses about 2.5 Mbytes of the 10-Mbyte RD51 disk.

Advanced Programmers Kit

The Advanced Programmers Kit is an optional add-on to the base kit. It includes MACRO program development capability, privileged code development, magtape ACP, and libraries. The base kit must be installed before the Advanced Programmers Kit can be installed.

Programming Tools

Micro/R SX programming tools now available on RX50 distribution include BASIC-PLUS-2, FORTRAN-77, COBOL-81, DIBOL-83, FORTRAN-77 DEBUG, Pascal, DATATRIEVE, DECType, and SORT/MERGE.

Micro/R SX SORT/MERGE

Micro/R SX SORT/MERGE is a utility for the Micro/R SX operating system. It can accept as input up to 10 RMS-11-formatted files and will produce as output one reordered RMS-11-formatted file. Records can be sequenced in ascending or descending order by as many as 16 key fields with a maximum total key size of 512 bytes.

Commands to Micro/R SX SORT/MERGE can be issued interactively via the standard command line interface or through the specification file created by the user. Micro/R SX SORT/MERGE routines are used directly by Micro/R SX COBOL-81 via the COBOL SORT and MERGE statements.

Micro/R SX SORT/MERGE includes a package of callable subroutines that allow many other Micro/R SX languages to execute a sort or merge. The subroutines accept for input either records, one at a time, from the host program or file specifications. The output can be either records, one at a time, or a complete file, regardless of the input mode.

This callable package also allows the user to specify several user-written routines that will be used instead of the predefined Micro/R SX SORT/MERGE routines. These routines include an equal-key callback, to be invoked whenever two keys are found to be equal; a user-defined key comparison algorithm; a user-defined warning routine to be invoked when non-fatal errors occur; and a user-defined input routine for the merge record interface.

SPD Number 18.13.xx^H

Introduction

MicroPower/Pascal-RT is a modular operating system and software development package for microcomputer applications. It includes a high-performance optimizing Pascal compiler, a subset of the RT-11 operating system, and all the tools you need to create, build, test, and debug concurrent realtime application programs. The user can create these applications on a PDP-11 host system for execution on a different target microcomputer, which can be any DIGITAL Q-bus or Extended Q-bus processor, from the FALCON SBC-11/21 to the PDP-11/23-PLUS. Each application is constructed especially for its target system, with the exact set of operating system services needed.

MicroPower/Pascal-RT is particularly suited for such dedicated, realtime microcomputer applications as process control, instrumentation, and robotics. An optimizing compiler produces fast, compact object code compatible with any Digital Q-bus PDP-11 microcomputer. MicroPower/Pascal-RT includes the following features.

Two-Processor Development Environment

MicroPower/Pascal-RT uses a two-processor development environment: a host PDP-11 running the RT-11 extended memory (XM) operating system, where the Pascal compiler and development utilities reside and execute, and a target Q-bus PDP-11, where the application program resides and executes. This provides the most effective work environment for developing target-system programs. A user can transport the final application program to the target microcomputer by one of three methods: writing it into read-only memory (ROM), downline-loading it over a serial line, or recording it on a floppy disk, tape cartridge or hard disk to be bootstrapped on the target system.

Concurrent Execution Capability

Concurrent execution means the Pascal source code is structured into independent parts, called processes, which appear to execute simultaneously. Each process cooperates with all other processes in manipulating such shared resources as memory and peripheral devices.

Customized System Routines

A modular runtime system software package that includes a library of executive service modules (modular operating system) is one of the major components of MicroPower/Pascal. By selecting only the appropriate components of the MicroPower/Pascal-RT Runtime System software, and merging it with suitable user-written software, users can create a highly streamlined software package for their applications. This application software will run stand-alone on the target runtime system; no other operating system is needed. MicroPower/Pascal-RT automatically selects those operating system services the application requires from a library in the PDP-11 host computer and places them in an executive module. By including only required system services, the module and the application it supports make the most efficient use of the target runtime system hardware. Furthermore, the modular runtime system is rommable, which eliminates the need for mass storage in the target system.

MicroPower/Pascal-RT is a Digital-supported/Customer-installed product. For ordering information, consult the *Software Product Descriptions (SPD)* for MicroPower/Pascal-RT 19.12.xx.¹¹

Introduction

The RSTS/E operating system is a multiuser, timesharing, and resource-sharing general purpose system. Its capabilities include batch processing, program development, and multiterminal applications. RSTS/E allows concurrent word processing and data processing and provides a highly productive and secure environment. As a timesharing system, RSTS/E provides excellent response time to a maximum of 127 users at one time, and up to 63 jobs at one time.

These additional features are offered on RSTS/E operating systems:

***Dynamic Allocation
of System Resources***

RSTS/E schedules CPU time and memory residency among jobs based upon their priority and processing requirements. A round-robin scheduling method is used to select jobs from those with equal priority. Systems with memory management can allocate enough address space for a job to run and can swap jobs out to disk storage when memory is needed for another job. A job's size can be expanded dynamically subject to the limits imposed by the system manager or another privileged user.

***Privilege Capabilities
and System Operation***

RSTS/E gives each user access to all system resources and peripherals unless otherwise restricted by the system manager or another privileged user. A privileged user has full access and control over system operations, including starting up and shutting down the system, adding or deleting user accounts, and designating certain programs as privileged.

DCL Command File Processing

DCL commands can be placed in a standard file and executed as a single command. Programming style commands can also be used to allow the "non-programmer" to easily automate routine tasks.

Batch Processing

Users can submit DCL command files as batch jobs to perform tasks that require no terminal interaction or to run programs at a later time. The user can specify the amount of CPU time for each batch job submitted and can specify termination conditions by requesting error-level checking.

File System

The RSTS/E file system provides a variety of online capabilities. Files can be accessed randomly or sequentially, can be created, updated, extended, or deleted, and can be sorted by the SORT/MERGE utility. File access can be limited on an individual, group, or system basis. Total or selective file backup and restoration can be done online. The RSTS/E backup command provides streaming support for streaming tape drives.

RMS-11 is the main file and record access method available on RSTS/E. It supports sequential, relative, and indexed file organizations. With the indexed file organization each indexed file can have one primary key and up to 254 alternate keys. Indexed files are restricted to either a fixed or a variable record format.

RSTS/E disk volumes, when used as file-structured devices, can be either public or private. A public volume is the system disk or any volume-initialized public disk. All other volumes are designated private and can be used to limit user access and ensure greater system security.

RSTS/E can minimize accesses to disk for frequently used data by keeping data in a software-maintained cache, a specially designated area in system memory. The data retained in this cache can be restricted to disk directory blocks or can include data from disk files.

For ordering information, consult the *Software Product Descriptions (SPD)* for RSTS/E 13.01.xx.

User Interface

User commands are handled and interpreted by one of the runtime systems that acts as a command interface. The four standard command monitors include the Digital Command Language (DCL); BASIC-PLUS, a single-language system; RSX, which provides the Monitor Console Routine (MCR); and RT-11, which provides RT-11 system commands. All of these interfaces interpret sets of system commands that enable the user to log on and off the system, manipulate files, develop and test programs, and obtain system information.

The Concise Command Language (CCL) feature allows each installation's system manager to define additional commands to run system utilities and user programs. In addition, each user can define commands or groups of commands to meet individual requirements.

Programming Tools

Program development is facilitated by a selection of system utilities, high-level languages, and text editors, including EDT, and can be done on the BASIC-PLUS, RSX, or RT-11 runtime systems. The BASIC-PLUS runtime system provides the BASIC-PLUS interpretative language bundled with RSTS/E. These environments provide an assembler, a linker or taskbuilder, and a librarian utility. The MACRO-11 Assembly Language provides full MACRO programming capabilities, including MACRO libraries, conditional assembly directives, and pseudo-operations. RSTS/E uses resident libraries for sharing of code that is common to more than one job.

Message Router for RSTS/E

Message Router for RSTS/E is a store and forward message transport system that optimizes message delivery within a DECnet Phase III or Phase IV network. This product runs on a properly configured RSTS/E operating system that supports a DECnet Phase III or Phase IV network. Message Router for RSTS/E supports the existing Standard for Network Protocol, Interface and Formatting being developed for Message Handling Systems by the National Bureau of standards (NBS).

Introduction

Micro/RSTS is a pre-built subset of RSTS/E. System calls and programming facilities which are supported by RSTS/E are also supported by Micro/RSTS, allowing programs written for RSTS/E to run unaltered on Micro/RSTS. Micro/RSTS allows a maximum of 10 jobs and 14 terminals. It is available in two kits to meet the needs of two functionally distinct markets. A Base Kit is available as an applications engine and for BASIC-PLUS development (the language is included). An Application Development Kit is also available which can be added to the Base Kit to provide support for developing applications using MACRO-11 (included) and high level compilers. The base kit is a prerequisite for the Application Development Kit.

Micro/RSTS does not support communications using DECnet or batch processing due to the limited storage currently available. Communications and batch processing will become available in the future.

Micro/RSTS uses the DCL command language which is specifically designed for people with limited computer knowledge and includes a simplified documentation set.

The Base Kit

Standard with the Base Kit are the Micro/RSTS operating system configured for the MicroPDP-11 distributed on the RX50 floppy disks, with appropriate documentation. RSTS/E Operating System Utilities, BASIC-PLUS, RMS-11, EDT, SORT/MERGE, RSX Emulation, and RT Emulation.

The purpose of this kit is to provide a product for users who only require that part of the operating system which is needed to run application such as those available through the *Software Source Book*. Also served by this kit are those who use BASIC-PLUS as their only development language.

The Application Development Kit

The Micro/RSTS Application Development Kit which layers on the base kit includes utility programs and documentation that allows programmers to do software development on the MicroPDP-11 in MACRO-11 (included) and provides a base for adding layered product compilers such as FORTRAN-77, FORTRAN-77 DEBUG, BASIC-PLUS-2, COBOL-81, and others. This kit is not required for BASIC-PLUS development.

Included with the Micro/RSTS Application Development Kit on RX50 floppy disks are appropriate documentation, MACRO-11, RSX Utilities, RT11 Utilities, Task Builder (TKB), Librarian for RSX, LINK (RT11), Librarian for RT11, and RMS-11 Utilities.

Installation and Operation

Both kits have been designed and tested to be customer installable by the novice user using the *Micro/RSTS Installation Guide*.

Disk and Memory Usage

Approximately 3 Mbytes are used by the base kit and 2 Mbytes by the Application Development Kit. Applications which require more than the remaining space should add a second disk.

The minimum required memory is 256 Kbits. If simultaneous use of three or more large programs is expected then additional memory is recommended to improve performance. If more than four simultaneous users are required additional memory must be added.

Introduction

The RT-11 operating system is a single-user, realtime operating system designed for interactive program development of online application execution on Professional 300 Series, PDP-11 and LSI based systems. Although it is a single-user system, RT-11 supports both single job (SJ) and foreground/background (FB/XM) modes of processing, as well as a number of system jobs. In addition to a variety of system and program utilities, RT-11 supports a number of high-level language processors including BASIC-11 and FORTRAN-77.

The emphasis in RT-11 is on efficient use of system resources, minimizing system requirements in the CPU and on the mass storage devices, while maximizing system throughput. The RT-11 operating system offers the following configurations:

Single Job(SJ) Monitor—Enables one job at a time to execute in memory. As distributed, SJ resides in approximately 6 Kbytes of memory and requires minimal overhead. Should the user's requirements change, a properly written program that runs under the SJ monitor can be executed under the FB or XM monitor as a background program without modification, provided there is sufficient memory.

Foreground/Background(FB) Monitor—Provides for the simultaneous execution of up to seven jobs in the foreground and a background job. The realtime function is accomplished in the foreground, which generally has priority on system resources. Functions that do not have critical response time requirements, such as program development, are accomplished in the background, which operates whenever the jobs in the foreground cannot run. Within their priorities, both foreground and background jobs are fully functional RT-11 programs with access to system capabilities.

Extended Memory (XM) Monitor—Has the features of the FB monitor and supports systems with more than 64 Kbytes of memory. XM allows programs to extend their size to the full PDP-11 virtual address space of 64 Kbytes. By program control an RT-11 job may allocate and use all available physical memory not used by the monitor or other jobs. A Linker option allows user programs to have overlays in extended memory for fast access.

Features

Ease of Use

English language keyboard commands are easy to use and understand. The commands are both system- and user-defined. Customer installable RT-11 performs Automatic Installation by conducting an interactive dialog with the user at the terminal.

Flexible Realtime I/O

Three modes of I/O operation are provided to satisfy a variety of input and output requirements. Synchronous I/O suspends user program processing until the completion of an I/O event. With asynchronous I/O, user program processing continues until a user-defined point is reached. Processing is then suspended until the I/O event is completed. Event-driven I/O allows user program processing to continue until the I/O event completes. Processing is then interrupted to service the completed I/O event.

Programming Capabilities and Tools

Capabilities include device-independent I/O programming and ease-of-writing device interfaces. Program development tools offered within RT-11 include a choice of three text editors, file and device maintenance utilities, an online debugger, and a number of patch utilities. With DECnet-RT, Digital's advanced networking software, RT-11 systems can be linked with other Digital operating systems for network operation.

Communications Options

DECnet/RT, Digital's optional networking software, provides Phase III end node network operations for RT-11 systems linked with other Digital operating systems.

Introduction

ULTRIX-11 is an enhanced, supported native UNIX* operating system based on AT&T's UNIX Timesharing System, Seventh Edition. It is a general purpose, interactive, timesharing operating system that optimizes the programmer's skill rather than the instruction set of a machine. All of the features found in Version 7 UNIX software are found in ULTRIX-11 software. These include a hierarchical file system with demountable volumes; compatible file; device and interprocess I/O; asynchronous processes; a system command language selectable on a per-user bases; C compiler; and FORTRAN, Assembler, C-Shell, Bourne Shell, UUCP, and mail.

*UNIX™ is a trademark of AT&T Bell Laboratories

ULTRIX-11 software also has incorporated Version 3.7 of the "vi" full-screen editor from U.C. Berkeley/UNIX 2.8 distribution and a modified version of the Berkeley User Overlay Scheme for large programs.

Features

- Dynamic Disk bad-block replacement
- Fully automatic system generation
- System management commands
- Overlay kernel for use on CPUs without separate I and D space
- Crash dump analyzer
- Source-Code Control System

ULTRIX-11 Operating System Ordering Information

	Maximum 16 Users (MICRO/PDP-11 Only)	Maximum 16 Users	Maximum 32 Users
License with Warranty	QJ085-UZ	QJ087-UZ	QJ088-UZ
Media and Documentation		QJ087-H4	
Floppy Diskette	QJ085-H3	QJ087-HD	
RL02 Hard Disk		QJ087-HH	QJ088-HD
Magnetic Tape (1600 b/in)		QJ087-HM	QJ088-HM
SPD Number	16.51.xx	16.51.xx	16.51.xx

*UNIX™ is a trademark of AT&T Bell Laboratories.

PDP-11 Operating System General License

The PDP-11 Operating System General License is a package of license plus warranty (UZ) options for nine PDP-11 operating systems: RT-11, CTS-300, RSX-11M-PLUS, RSX-11M, RSX-11S, Micro/RSTS, Micro/RXS, RSTS/E, and DSM-11. MicroPower/Pascal and ULTRIX-11 are not included. The PDP-11 Operating System General License is a license with a warranty and a one-time right to copy. A customer must purchase (or have previously purchased) documentation and media for the operating system that is desired for copy and use.

Because it is a package, the customer has the right to copy all or any part of the package. For example, customers could choose to copy only RSTS/E if all they wanted to run was RSTS/E, or if they were using both RSTS/E and RSX-11M-PLUS, they could copy both. The general license package gives the customer the right to copy those operating systems and install them on only one additional CPU, just the same as all other license plus warranty options.

Refer to the *Software Product Descriptions (SPDs)* to determine the suitability of the systems in this section for your intended application. In particular, compliance with the stated hardware requirements in the SPD is a prerequisite for a license plus warranty.

Software Product Order Number	Single use License	PDP-11 General License*	System Startup Services			Distribution and Documentation	DECsupport	Basic	Self- maintenance
			OSSP1	OSSP2	OSSP3				
CTS-300 QJ354 SPD 12.09.xx	UZ	QJBxx- UZ				HH, HV, HX	9H, 9V, 9X	8H, 8V, 8X	3H, 3V, 3X
DSM-11 QJ821 SPD 12.18.xx	UZ	QJBxx- UZ				HD, HH, HM, HV	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
MicroPower/Pascal-RT QJ029 SPD 19.12.xx	UZ					H3, HH, HX		83, 8H, 8X	33, 3H, 3X
Micro/RSTS QY829 SPD 18.12.xx						H3	93	83	33
Micro/RSTS Development QY830 SPD 18.12.xx						H3	93	83	33
Micro/RSX QY800 Base-level Kit SPD 14.28.xx		(QJB51- UZ)				H3	93	83	33
Micro/RSX QY801 Advanced Programmers SPD 14.28.xx		Note				H3	93	83	33
RSTS/E QR430 SPD 13.01.xx	UZ		5D, 5H, 5M, 5V	7D, 7H, 7M, 7V	BD, BH, BM, BV	HD, HH, HM, HV	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
RSX-11M-PLUS QR500 RK07 RA60/80/81, RM02/03/05/80 and RP04/05/06/07 based systems SPD 14.70.xx	UZ		5D, 5M, 5V	7D, 7M, 7V	BD, BM, BV	HD, HM, HV	9D, 9M, 9V	8D, 8M, 8V	3D, 3M, 3V
RSX-11M-PLUS QJ503 RL02 based systems SPD 14.70.xx	UZ	QJBxx- UZ	5H	7H	BH	HH	9H	8H	3H
RSX-11M QJ629 RK07 based systems SPD 14.35.xx	UZ		5D, 5M, 5V	7D, 7M, 7V	BD, BM, BV	HD, HM, HV	9D, 9M, 9V	8D, 8M, 8V	3D, 3M, 3V
RSX-11M QJ637 RP04/05/06/07 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ737 RM02/03/05/80 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ676 RA60/80/81 based systems SPD 14.35.xx	UZ		5D, 5M	7D, 7M	BD, BM	HD, HM	9D, 9M	8D, 8M	3D, 3M
RSX-11M QJ738 RL02 based systems SPD 14.35.xx	UZ		5D, 5H, 5M	7D, 7H, 7M	BD, BH, BM	HD, HH, HM	9D, 9H, 9M	8D, 8H, 8M	3D, 3H, 3M
RSX-11S QJ642 SPD 9.21.xx	UZ	QJBxx- UZ				HD, HH, HM, HV	9D, 9H, 9M, 9V	8D, 8H, 8M, 8V	3D, 3H, 3M, 3V
RT-11 QJ013 SPD 12.1.xx	UZ	QJBxx- UZ	53, 5D, 5H, 5X	73, 7D, 7H, 7X	B3, BD, BH, BX	H3, HD, HH, HX	93, 9D, 9H, 9X	83, 8D, 8H, 8X	33, 3D, 3H, 3X
ULTRIX-11 QJ085 16 users Micro/PDP-11 only SPD 16.51.xx	UZ					H3	93	83	33
ULTRIX-11 QJ087 Maximum 16 users SPD 16.51.xx	UZ					HD, HH, HM, H4	9D, 9H, 9M, 94	8D, 8H, 8M, 84	3D, 3H, 3M, 34
ULTRIX-11 QJ088 Maximum 32 users SPD 16.51.xx	UZ					HD, HM, H4	9D, 9M, 94	8D, 8M, 84	3D, 3M, 34

*Consult the Software Product Descriptions (SPDs)

Note: The QY800 license (QJB51-UZ) and kit (QY800-H3) are prerequisite to QY801

Introduction

Most operating systems need additional software, such as programming languages and applications packages, to perform more specialized tasks than the operating system can perform alone. PDP-11 programming languages and applications are well-suited to the needs of industry, science, academia, and business. There is a wide range of languages and applications available on PDP-11 operating systems to meet all programming needs, from system software development to general purpose application program development. When choosing a language or application package, various criteria are relative performance, ease-of-use, price, portability, complexity, as well as specific functionality.

Some PDP-11 application packages are designed to give users with little computer familiarity the tools to perform specific tasks. The DECwordDP word processing package, DECmail-11 electronic mail, and the DATATRIEVE-11 query and report system are examples of such specialized packages. Other application products are designed for professional programmers to create new software for a much wider range of tasks. Programming languages and packages such as FMS-11 and the Professional Host Tool Kit fall into this category.

Programming languages have typically developed in response to specific functional needs. Some languages, such as FORTRAN, were originally intended for processing enormous amounts of numerical data through complicated formulas at high speeds. Others, such as COBOL and DIBOL, were developed for commercial applications in which data management played a major role. And still others, like BASIC, were invented for use by students who were unfamiliar with computers and needed a simple, easy-to-learn language related to everyday speech. While some of these distinctions have become blurred over time, it is still true that certain kinds of problems are best approached through specific languages. The descriptions in this section attempt to show the special strengths of each Digital-supplied language in satisfying specific application needs.

With an appropriate selection of languages and applications packages, the PDP-11 system can satisfy the computer needs of users of multiple levels of expertise and function.

BASIC-PLUS-2

BASIC-PLUS-2 is a high-level software implementation language derived from the original Dartmouth BASIC. Like the original, BASIC-PLUS-2 is a highly approachable language with an interactive user interface, online help text, and simple English-like language elements. Unlike many other BASICs, though, BASIC-PLUS-2 is a compiled language with modern block-structured programming constructs, sophisticated file access methods, and a host of program development tools aimed at increasing programmer productivity. This combination makes BASIC-PLUS-2 practical for a wide range of uses, from developing data processing applications to training new programmers. Also, since BASIC-PLUS-2 is a close subset of VAX BASIC, the two languages can be used together in projects with a mix of PDP-11 and VAX systems.

BASIC-PLUS-2 provides sequential, relative, indexed, and record file address (RFA) file access via the RMS Record Management System. Other features include a RUN command that allows immediate compilation and execution of the program currently in memory, a Load command that places previously compiled BASIC-PLUS-2 modules in memory for use by RUN, immediate-mode program debugging statements, the ability to omit line numbers and use mnemonic statement labels, and 31-character variable and constant names.

BASIC-PLUS-2 runs on RSX-11M, RSX-11M-PLUS, RSTS/E, Micro/RSX, and Micro/RSTS.

BASIC-11/RT-11 is a conversational programming language that uses simple, English-like statements and familiar mathematical notations to perform operations. It provides an interactive programming environment specially adapted for the RT-11 operating system.

BASIC-11/RT-11 is an incremental interpretive compiler with the following features: support for real, single- and double-precision, integer, and string data types; immediate-mode statements for debugging and desk calculator usage; sequential data storage using the RT-11 file system; string-manipulation capabilities, including string arrays and functions; disk virtual arrays for string, integer, and real data types; chaining with Common to accommodate large programs; a Call facility for invoking assembly language subroutines; and formatted output using the Print Using statement.

COBOL-81

The COBOL-81 language processor is a high-performance compiler designed for interactive PDP-11 business systems programming where ANSI-74 standard COBOL features, compact code, and low memory usage are of prime consideration. COBOL-81 shares a great deal of common syntax with VAX COBOL. In most cases, programs written in COBOL-81 can be compiled and executed using the VAX COBOL compiler without source-code changes.

COBOL-81 runs on the full range of PDP-11 systems. It lets users begin with the smallest PDP-11 system and grow to the largest VAX systems running VAX COBOL. The compiler takes full advantage of the PDP-11's optional Commercial Instruction Set (CIS) to generate even more-efficient object code. The compiler's extensive library facilities and interactive symbolic debugger help increase programmer productivity and enable the production of powerful application programs.

CORAL-66

CORAL-66 is the standard, general purpose language prescribed by the British government for realtime and process-control applications. A high-level, block-structured language, it replaces assembly-level programming in modern industrial and commercial applications. It is particularly useful for building software products that are expected to be long-lived and that require flexibility and easy maintenance.

Features of CORAL-66 include Byte, Long (32-bit integer), and Double (64-bit floating-point) data types; re-entrant code at the procedure level; generation of code executable on any valid RSX-11S operating system that includes the Extended Instruction Set (EIS); conditional compilation; English-language error messages at compile time and (optionally) at runtime; and a switchable option to select a target PDP-11 instruction set.

DIBOL-83, Digital's Business-Oriented Language, is a structured high-level language for commercial applications programming. It is similar to COBOL in that it has a Data Division and a Procedure Division and uses English-like procedural statements (although more concise than those of COBOL). DIBOL-83 is designed specifically for creating interactive applications programs.

DIBOL-83 is available as part of CTS-300 and Professional CTS-300, as well as an option on RSTS/E, RSX-11M-PLUS, Micro/RX, and VAX/VMS and on the Professional 300 computers under the P/OS operating system.

DECFORM, a powerful, easy-to-use data entry and file inquiry package, is included with DIBOL-83 on CTS-300, Professional CTS-300, and RSTS/E DIBOL for designing screen formats for data entry. Using interactive video terminals, programmers can produce forms on the terminal screen that closely resemble traditional printed forms. Thus DIBOL-83 and DECFORM work together to help programmers who are designing applications in data entry and retrieval.

Both DIBOL-83 and DECFORM have their own interactive debugging utilities to speed program development. DIBOL-83 performs data manipulation, arithmetic expression evaluation, table subscripting, record redefinition, external calls to other programs, and sequential, random and indexed access to files. DECFORM features facilities for defining data entry field protection, autoduplication, alphabetic or decimal checking, range checking, field totaling, crossfield validation, and autoincrement of counters.

FORTRAN IV

FORTRAN IV is an extended superset of the ANSI X3.9-1966 standard for this scientific and engineering programming language. Its high-speed, one-pass optimizing compiler works very efficiently in small-memory environments, making FORTRAN program development possible on smaller PDP-11 systems. Because it can produce absolute binary code suitable for stand-alone PDP-11 systems or for loading into ROM or PROM memory, Digital's FORTRAN IV is especially useful for such industrial applications as control programs for automated equipment.

Other features of FORTRAN IV include the ability to use general expressions in all meaningful contexts, mixed-mode arithmetic, the Byte data type for character manipulation, commenting at the end of each source line, and list-directed input/output.

FORTTRAN-77 is much more than just a scientific and engineering language. It combines the efficient numerical computation for which FORTRAN is known with provisions for keyed and sequential access to RMS multikey ISAM files. This makes FORTRAN-77 ideal for writing programs that must manipulate and perform calculations on masses of data, as in accounting or statistical packages. FORTRAN runs on RSTS/E, Micro/RSTS, RT-11, RSX-11M, RSX-11M-PLUS, and Micro/RSX-based PDP-11 systems.

FORTTRAN-77 is built on the ANSI subset FORTRAN X3.9-1978 standard, with the following extensions: Type and Accept input/output statements, the BYTE data type, hexadecimal and octal constants, virtual memory arrays (on systems equipped with memory management), and language elements to perform RMS multikey ISAM. To use RMS files and utilities, FORTRAN-77 programs make use of the RMS Object Time System (RMS OTS); a File Control Services OTS (FCS OTS) is also available. The compiler produces direct PDP-11 machine code optimized for execution-time efficiency, especially when executed on systems equipped with a floating-point processor.

FORTTRAN-77 DEBUG is a symbolic debugging tool available for use in finding runtime errors in programs which compile and taskbuild successfully. FORTRAN-77 DEBUG can be used to debug applications written in FORTRAN-77 or in MACRO, or in a combination of both. This tool is available as a separate product on RSTS/E, Micro/RSTS, RSX-11M, RSX-11M-PLUS, and Micro/RSX.

RMS file capabilities are not available for FORTRAN-77 running under RT-11.

PDP-11 PASCAL

PDP-11 PASCAL is a high-level language for developing business, manufacturing, research, and educational programs. Its English-like commands, logical grammar, and block structure help developers produce programs that have clear organization and linear flow.

PDP-11 PASCAL includes the features of the Level 0 ISO Specification for Computer Programming Language PASCAL (ISO 7185), plus many powerful extensions to the basic PASCAL language. PDP-11 PASCAL runs on all RSX-11M and RSX-11M-PLUS-based PDP-11 systems that have the Extended Instruction Set (EIS). It also runs on Micro/RSX systems that are configured with either the KEF11-AA Floating-Point Chip option or the PPF11 Dot Floating-Point Processor Card. PDP-11 PASCAL/RSX uses FCS for file I/O and supports sequential or direct record access, plus fixed-length or variable-length records. PDP-11 PASCAL/RSX supports many RSX features, including cluster libraries and I & D space separation, and it provides access to the RSX executive directives.

Micro/RSX COBOL-81

Micro/RSX COBOL-81 is a high-level language for business data processing that operates under control of the Micro/RSX operating system. It is based on the ANSI COBOL Standard X3.23-1974 and includes some features planned for the next COBOL standard. Micro/RSX COBOL-81 shares some common syntax with VAX COBOL and includes various Digital extensions to COBOL, including screen handling at the source-language level.

Micro/RSX COBOL-81 consists of a compiler and an Object Time System/Library. The compiler produces an object module from a source program. The compiler is capable of producing a source listing with embedded diagnostics indicating the line and position of a source-code error, a data-name map, a procedure-name map, and a cross-reference listing in alphabetical order. Object modules produced by the compiler can be linked with other object modules produced by either MACRO-11 or COBOL-81 language processors. These subprograms are accessed with the CALL statement.

Features

- Set and Cancel breakpoints by line number, paragraph name or section name
- Display contents of a data name
- Define and Undefine synonyms
- Show synonyms or breakpoints
- Move literal to data name
- Proceed (resume program execution)
- Stop (stops program execution)
- Help facility

Micro/RXS COBOL-81 file I/O operations are controlled through the RMS data management software. This method of record I/O supports sequential, relative, and indexed file operations. Micro/RXS COBOL-81 also supports the Commercial Instruction Set (CIS).

SPD Number:

18.03.xx

Micro/RXS FORTRAN-77

Micro/RXS FORTRAN-77 is an extended implementation of the ANSI subset FORTRAN-77 standard (X3.9-1978) that runs on the Micro/RXS operating system. Micro/RXS FORTRAN-77 contains all the features of the ANSI FORTRAN-77 subset, many of the full-set language features, and extensions that are not included in the ANSI FORTRAN-77 standard. Switch-selectable support is provided for user programs based on the previous ANSI FORTRAN Standard (X3.9-1966).

Micro/RXS FORTRAN-77 programs can be optionally executed under control of Micro/RXS FORTRAN-77 DEBUG (SPD 14.79.xx). Execution of application programs using PDP-11 FORTRAN-77 DEBUG aids in the locating of programming errors in successfully compiled programs that behave abnormally when executed.

SPD Number:

18.04.xx

Micro/RXS DIBOL

Micro/RXS DIBOL is a high-level procedural language designed specifically for interactive business data processing that runs under the Micro/RXS operating system. It is highly compatible with DIBOL-83 implementations on other operating systems including RSTS/E, CTS-300, RSX-11M-PLUS, and P/OS. It also provides Micro/RXS-specific extensions and an expansion path for applications requiring the advantages of Micro/RXS while retaining the capabilities and advantages of DIBOL-83. Micro/RXS DIBOL provides efficient terminal handling and efficient access to the Micro/RXS Record Management Services (RMS). RMS provides sequential, relative, and multikey indexed record access. Micro/RXS DIBOL product includes a compiler, a runtime library, external subroutine libraries, and DIBOL Debugging Technique, and the ability to communicate between programs.

SPD Number:

18.05.xx

Micro/RXS BASIC-PLUS-2

Micro/RXS BASIC-PLUS-2 is the same extended BASIC compiler as the one for the RSX-11M or RSX-11M-PLUS operating system. It takes full advantage of the PDP-11 floating-point and integer instructions. Micro/RXS BASIC-PLUS-2 provides a high-performance program execution environment for applications development and timesharing by generating threaded code instructions. It combines immediate mode with the power of a structured programming language.

SPD Number:

18.06.xx

Micro/RSX PDP-11 Pascal is an implementation of the Pascal language that accepts programs compatible with Level 0 of the ISO Specification for the Computer Programming Language Pascal (Draft International Standard 7185). Micro/RSX PDP-11 Pascal is a multipass optimizing compiler that provides all standard Pascal data types and statements as well as extensions.

Micro/RSX PDP-11 Pascal allows the use of the FORTRAN standard calling sequence, permitting Pascal programs to communicate with FORTRAN callable system routines for realtime applications. However, routines written in FORTRAN cannot be called from Micro/RSX PDP-11 Pascal. In addition, Micro/RSX PDP-11 PASCAL programs can call Micro/RSX system services for process control operations, system directives, and special peripheral access.

SPD Number:

18.07.xx

Micro/RSTS COBOL-81

Micro/RSTS COBOL-81 is a high-level language for business data processing that operates under control of the Micro/RSTS operating system. It is based upon the 1974 ANSI COBOL Standard X3.23-1974 and includes some of the features planned for the next COBOL standard. Micro/RSTS COBOL-81 shares some common syntax with VAX COBOL and includes various Digital extensions to COBOL, including screen handling at the source-language level.

Micro/RSTS COBOL-81 consists of a compiler and an Object Time System/Library. The compiler produces an object module from a source program. The compiler is capable of producing a source listing with embedded diagnostics indicating the line and position of a source-code error, a data name map, a procedure name map, and a cross-reference listing in alphabetical order.

SPD Number:

18.08.xx

Micro/RSTS BASIC-PLUS-2

Micro/RSTS BASIC-PLUS-2 is an extended BASIC compiler that runs under the Micro/RSTS operating system. BASIC-PLUS-2 provides a high performance program execution environment for applications development and timesharing by generating threaded code instructions. It combines immediate mode with the power of a structured programming language.

Micro/RSTS BASIC-PLUS-2 uses the full printable ASCII character set and 8-bit character codes within constants and I/O operations. The BASIC-PLUS-2 user has the option of traditional compilation with subsequent linker invocation or, in most cases, use of the RUN command that causes the program to be placed into execution.

SPD Number:

18.09.xx

Micro/RSTS FORTRAN-77 is an extended implementation of the ANSI subset FORTRAN-77 standard (X3.9-1978) that runs on the Micro/RSTS operating system. Micro/RSTS FORTRAN-77 contains all the features of the ANSI FORTRAN-77 subset, many of the full-set language features, and extensions that are not included in the ANSI FORTRAN-77 Standard. Switch-selectable support is provided for user programs based on the previous ANSI FORTRAN Standard (X3.9-1966).

Micro/RSTS FORTRAN-77 programs can be optionally executed under control of Micro/RSTS FORTRAN-77 DEBUG (SPD 18.11.xx). Execution of application programs using Micro/RSTS FORTRAN-77 DEBUG aids in the location of programming errors in successfully compiled programs that behave abnormally when executed.

SPD Number:

18.10.xx

**Micro/RSTS FORTRAN-77
DEBUG**

Micro/RSTS FORTRAN-77 DEBUG is a fully symbolic debugger for FORTRAN-77 and MACRO-11 running on Micro/RSTS. Micro/RSTS FORTRAN-77 DEBUG aids in the location of programming errors in successfully compiled programs that behave abnormally when executed. Micro/RSTS FORTRAN-77 DEBUG runs as a two-task debugger. A small portion of the code necessary to debug applications is linked with the user task; the major portion of the debugger runs as a separate task.

Micro/RSTS FORTRAN-77 DEBUG provides access to program symbols by reading the symbol table file produced by the taskbuilder. Micro/RSTS FORTRAN-77 DEBUG can understand symbols produced by Micro/RSTS FORTRAN-77 and MACRO-11.

To enable debugging of FORTRAN-77 programs, the user must specify a switch in the compiler command line. This switch specifies that information about the symbols in the FORTRAN-77 application will be put into the object file created by the compiler. To enable debugging of MACRO-11 programs, the user must specify a switch in the assembler command line. This causes information about the symbols in your assembly language program to be available to Micro/RSTS FORTRAN-77 DEBUG.

SPD Number:

18.11.xx

**Programming Languages
Ordering Information**

				Order Code (SPD Number)			
Product	RT-11	RSTS/E	Micro/RSTS	RSX-11M/ M-PLUS	Micro/RSX	Professional Tool Kit	Pro/Host Tool Kit
BASIC-PLUS-2		QJ916-HD, HM, HH, HV, UZ QY916-HM, HH (14.54.xx)	QY809-H3, HZ, UZ (18.09.xx)	QJ918-HD, HM, HH, HT, HV, UZ QY918-HM, HH (14.11.xx)	QY805-H3, HZ, UZ (18.06.xx)	QBA17-A3, HZ, UZ (40.23.xx)	QJ073-HD, HH, HM, HV QC352-HM, HG, UZ QD352-HM, HG, UZ QE352-HM, HY, UZ (30.27.xx)
BASIC/RT-11	QJ913-H3, HM, HH, UZ						
COBOL-81		QJ993-HM, HH, HD, HV, UZ QY993-HM, HH (13.16.xx)	QY808-H3, HZ, UZ (18.08.xx)	QJ994-HM, HH, HD, HQ, HT, HV, UZ QY994-HM, HH (14.26.xx)	QY802-H3, HZ, UZ (18.03.xx)	QBA19-A3, HZ, UZ (40.24.xx)	QJ081-HD, HM, HH, HV, HZ, UZ QC714-HG, UZ QD714-HG, UZ QE714-HY, UZ (30.31.xx)
CORAL-66				QP066-HM, HH, UZ (14.56.xx) (RSX-11M only)			
DIBOL-83	(See CIS-300)	QP528-HM, HH, UZ QY526-HM, HH (14.08.xx)		QP540-HM, HH, UZ QY540-HH, HM (14.24.xx)	QY807-H3, HZ, UZ		
FORTTRAN-IV	QJ813-H3, HM, HH, UZ (12.10.xx)	QR435-HH, HM, UZ (12.41.xx)		QP230-HH, HM, UZ (14.63.xx)			
FORTTRAN-77	QA609-C3, CM, CQ, CY (A3.55.xx)	QR100-HM, HH, HD, HV, UZ QY100-HH, HM, UZ (14.49.xx)	QY810-H3, HZ, UZ (18.10.xx)	QJ668-HM, HH, HD, HT, HV, HQ, UZ QY668-HH, HM, UZ (14.31.xx)	QY803-H3, HH, UZ (18.04.xx)	QBA15-A3, HZ, UZ (40.21.xx)	QJ074-HD, HH, HM, HV, UZ QC353-HG, UZ QD353-HG, UZ QE353-HY, UZ (30.38.xx)
FORTTRAN-77 DEBUG			QY811-H3, HZ, UZ				
PASCAL/RSX				QJ128-HM, HH, HD, HT, HV, HQ, UZ QY128-HM, HH (14.18.xx)	QY806-H3, HZ, UZ (18.07.xx)		

Support Categories

BASIC-PLUS-2, DIBOL-83, PDP-11 SORT/MERGE, and DECword/DP are Digital-supported/Digital-installed products. The Professional Toolkit, MENU-11, and CORAL-66 are customer-supported. All other programming languages listed in this section are Digital-supported/customer-installed.

The following sets of suffixes indicate the media for each software product.

Ordering Information

Order Code	Option
-H3	Binaries on RX50 floppy diskettes and documentation.
-HM	Binaries on 9-track, 1,600-b/in magtape and documentation.
-HH	Binaries on RL02 cartridge disk and documentation.
-HG	Binaries on TU58 cartridge tape and documentation.
-UZ	Single-use license with warranty.
-GZ	Documentation-only kit.

Refer to the *Software Product Descriptions (SPDs)* for additional information on ordering options and support details for each product.

DATATRIEVE-11

DATATRIEVE-11 is an interactive query, report-writing, and data maintenance system designed to give noncomputer professionals easy access to system databases. It has many online prompting, help, and tutorial features to help computer novices "do it themselves," relieving DP staff of long schedules of small projects. DATATRIEVE-11 is especially useful for users, such as business analysts and middle-management, who make frequent and constantly changing requests for data from a large, established database. It can also be used to build and maintain small personal databases.

DATATRIEVE-11 uses the RMS-11 Record Management System to access data records in sequential, relative, or indexed files. Users can selectively retrieve, sort, format, and update data and generate printed reports. Frequently used sequences of commands can be stored in a data dictionary for later use and for sharing among users. An Application Design Tool (ADT) interactively steps novice users through the process of creating domain and record definitions.

Micro/R SX DATATRIEVE-11

Micro/R SX DATATRIEVE-11 is an interactive query, report, and data maintenance system designed for the less-sophisticated computer user. Micro/R SX DATATRIEVE-11 uses the RMS-11 record management services to access data contained in disk files of sequential, indexed, or relative organization. Micro/R SX DATATRIEVE-11 provides facilities for selective data retrieval, sorting, formatting, updating, and report generation, without the need for programming.

Record and domain (file) definitions entered in Micro/R SX DATATRIEVE-11 are stored in Data Dictionaries shared by Micro/R SX DATATRIEVE-11 users. Data Dictionaries can also be used to store frequently used sequences of commands to be recalled and processed later. Commands are provided to list the contents of the Data Dictionary, to delete entries, and to control access to individual entries in the Data Dictionary. A Dictionary Compression utility is provided to compress the Data Dictionary file.

Micro/R SX DATATRIEVE-11 enables the user to define domains that cross RMS file definitions and subset record definitions. Micro/R SX DATATRIEVE-11 provides the Application Design Tool (ADT) to assist the novice user in creating domain and record definitions. The ADT uses an interactive dialogue technique to guide the user through the data definition process. It creates an indirect command file that is then processed to actually update the Micro/R SX DATATRIEVE-11 Data Dictionary.

SPD Number:

18.15.xx

FMS-11 (Forms Management System) is used by application programmers to build interactive, screen-oriented data entry capabilities into their application programs. Used in conjunction with a standard programming language such as FORTRAN, COBOL-81, or BASIC-PLUS-2, FMS-11 can be used for any data entry application in which paper forms were traditionally used, such as inventory, payroll, bookkeeping, and patient admittance. FMS-11 can aid productivity at all levels: program designers are spared the complexities of creating custom terminal interfaces to use special features of the VT100; program developers can debug and correct forms quickly with FMS-11's own forms-debugging and editing utilities; and the application's end user gets an intelligent data entry system that minimizes keystrokes and catches most common typing errors.

Components of the FMS-11 package are: the Form Editor for layout and modification of video forms on a VT100 screen; the Video Keypad Editor for general purpose text editing of standard ASCII files; the Form Utility for manipulation of FMS forms descriptions during debugging; the Form Driver for performing screen processing at application runtime; and, on RT-11, the Application Run-Time Supervisor for running application programs independently of programs running on other system terminals.

QUILL

QUILL is an easy-to-use layered software package designed to run on the CTS-300 operating system. With simple, English-like commands, users can take advantage of its three output capabilities: terminal queries, report generation on a printer or disk, and document listings on CTS-300 DECType. QUILL's commands generate automatic output, in a format that can be reused, against current, up-to-date data.

QUILL uses dictionaries to describe data files. These dictionaries support CTS-300 fixed-length sequential and ISAM file structures. Each physical field has a logical field name associated with it. The dictionary structure also supports password and field protection, multiple Dictionaries for a single data file, overlaid fields, dictionary identification from a relative dictionary, and maintenance routines to create, modify, copy, delete, and print dictionaries. Arithmetic, relational, or boolean expressions can be used with names in the Dictionary to locate records within a data file.

QUILL features ascending and descending sort of up to eight individual fields. Its default structure provides standard output formats. Capabilities for customized formats are available. Interactive and batch modes of operation can be called by a menu. A help facility that can be tailored is also provided.

PDP-11 SORT/MERGE provides a fast and flexible means of reordering (sorting) and combining (merging) data in files. It is composed on several components including the SORT Utility Program, the MERGE Utility Program, a SORT/MERGE callable subroutine package, and a detailed documentation set.

Commands can be issued interactively via the command-line interfaces and through a specification file or user-created command files. There is a DCL interface as well as online help for the DCL interface. Up to 10 files can be sorted and merged. Collating sequences include ASCII, EBCDIC MULTINATIONAL, and one defined by a user.

Micro/RSX SORT/MERGE

Micro/RSX SORT/MERGE is a utility for the Micro/RSX operating system. It can accept as input up to 10 RMS-11 formatted files and will produce as output one reordered RMS-11 formatted file. Records can be sequenced in ascending or descending order by as many as 16 key fields with a maximum total key size of 512 bytes.

Commands to Micro/RSX SORT/MERGE can be issued interactively via the standard command-line interface or through the specification file created by the user. Micro/RSX SORT/MERGE routines are used directly by Micro/RSX COBOL-81 via the COBOL SORT and MERGE statements.

Micro/RSX SORT/MERGE includes a package of callable subroutines, which allow many other Micro/RSX languages to execute a sort or merge. These subroutines accept either records, one at a time, from the host program or file specifications for input. The output may be either records one at a time or a complete file, regardless of the input mode.

This callable package also allows the user to specify several user-written routines that will be used instead of the predefined Micro/RSX SORT/MERGE routines. These routines include an equal-key callback, to be invoked whenever two keys are found to be equal; a user-defined key comparison algorithm; a user-defined warning routine to be invoked when nonfatal errors occur; and a user-defined input routine for the merge record interface.

SPD Number:

18.13.xx

For further information refer to the *Software Product Descriptions (SPDs)* for additional option ordering information and support details for each product.

BCP Graphics Software

The BCP Bar Code/Block Character software package lets RSX-11M users print out industry-standard Code 39 bar codes, block characters, and vertical and horizontal lines and dashes on Digital's LXY12/LXY22 graphics lineprinters. The package provides quick and easy production of labels for warehouse, stockroom, and other inventory tracking operations.

The package's interactive user program lets users enter data to be coded for immediate printout of bar codes and block-lettered labels. A library of graphics routines are also provided that can be combined with applications programs written in FORTRAN-77, for fully automated label generation. Both parts of the package require that the RSX-11M system on which they run have FORTRAN-77 plus a minimum 40 Kbytes of memory.

BCP is shipped with the LXY12 and LXY22 graphics lineprinters and must be specified when ordering hardware. The following is the ordering information:

BCP Graphics Software

Operating System	Media	Order Codes
RSX-11M	9-track magtape (800 b/in)	QJS05-AD
	9-track magtape (1600 b/in)	QJS05-AM
	RL01	QJS05-AQ
	RX01	QJS05-AY
	RL02	QJS05-AH

A-to-Z Business Graphics

See description under **A-to-Z Software**.

DECgraph-11

DECgraph-11 is an interactive business graphics application for the RSTS/E environment. Through the use of illustrated menus, a nontechnical user can easily input the data to be graphed, design the graph description, and combine the data and description to create a graph file for display on the terminal or printer. Because the data, design, and graph files are maintained independently, it is possible to use modified or new data with a previously designed graph, or to use the same data for a different type of graph.

DECgraph-11 uses the graphic capabilities of the VT240, VT241, and graphic-mode printers. Graphic images can be represented in black-and-white formats with the use of selected fill and line patterns.

Another feature of DECgraph-11 is a program interface, which allows it to be integrated with other applications. For example, it could be integrated with DATATRIEVE-11 to provide graphics output for DATATRIEVE-11 applications.

The prerequisites include any valid RSTS/E system with 400 free blocks of disk space and 64 Kbytes of dedicated main memory; an LA100, LA50, or LA12; and RMS support.

RGL

RGL (ReGIS Graphics Library) is a set of FORTRAN subroutines providing full data plotting and flexible picture-drawing capabilities for the VT125 video terminal. The RGL subroutines are callable from any RT-11, RSX-11M, or VAX/VMS programming language (e.g., FORTRAN, BASIC, PASCAL) and support the ReGIS firmware included with the VT125 terminal. Picture-drawing features of RGL include user-defined multiple subscreens; shading; line patterns; writing modes; and picture objects such as boxes, arcs, circles, and regular polygons. RGL also provides a method for storing and later recalling screen images. Data plotting capabilities allow the user to define various types of graph "papers," such as linear, logarithmic, polar, or probability. RGL provides numeric and alphanumeric

labeling and scaling of axes. The plotting subroutines are divided into static and dynamic segments. Static routines display all the user's data in one call. Dynamic routines allow point plotting (data added to a previously displayed "paper") and continuous-display mode, where data can be scrolled left or right. RGL is Digital-supported and customer-installed.

RGL Software Plus VT125-AA

Distribution Media	RT-11	RSX-11M
9-track 800 b/in magtape	VT125-HD(JD)	VT125-LD(MD)
RK05 disk cartridge	VT125-HE(JE)	VT125-LE(ME)
RL02 disk cartridge	VT125-HH(JH)	VT125-LH(MH)
9-track 1600 b/in magtape		VT125-LM(MM)
RL01 disk cartridge	VT125-HQ(JQ)	VT125-LQ(MQ)
RX02 floppy diskette	VT125-HX(JX)	
RX01 floppy diskette	VT125-HY(JY)	

RGL Software plus VT100 to VT125 Upgrade or RGL Software plus VT105 to VT125 Upgrade

Distribution Media	RT-11	RSX-11M
9-track 800 b/in magtape	VT1XX-HD	VT1XX-LD
RK05 disk cartridge	VT1XX-HE	VT1XX-LE
RL02 disk cartridge	VT1XX-HH	VT1XX-LH
9-track 600 b/in magtape		VT1XX-LM
RL01 disk cartridge	VT1XX-HQ	VT1XX-LQ
RX02 floppy diskette	VT1XX-HX	
RX01 floppy diskette	VT1XX-HY	

PLXY-11

PLXY-11 is a software package designed to provide RT-11, RSX-11M, RSX-11M-PLUS, and RSTS/E applications programmers access to the plotting capabilities of Digital's LXY12/LXY22 graphics lineprinters. Using the PLXY-11 graphics subroutines, programmers can create software that prints out representations of data in graphs and charts with clear alphanumeric labeling. This makes PLXY-11 useful for equipping scientific, engineering, statistical, and econometric application programs with graphics.

To use PLXY-11, the programmer writes FORTRAN programs that call the appropriate subroutines in the PLXY-11 library. These subroutines convert the program's graphics requests into a series of vectors stored in an intermediate file. This file is submitted to the PLXY-11 post-processing task, which converts its vector data into raster format suitable to the LXY12/LXY22 graphics lineprinters. The user then transfers this converted file to the graphics printer via a standard file transfer utility such as PIP, where it is printed out by the system LP11 lineprinter driver.

PLXY is shipped with the LXY12 and LXY22 graphics lineprinters and must be specified when ordering hardware. The following is the ordering information:

PLXY Graphics Software

Operating System	Media	Order Codes
RSX-11M	9-track magtape (800 b/in)	QJS90-XD
	9-track magtape (1600 b/in)	QJS90-XM
	RL01	QJS90-XQ
	RX01	QJS90-XY
RSX-11M-PLUS	9-track magtape (800 b/in)	QJS95-XD
	9-track magtape (1600 b/in)	QJS95-XM
RSTS/E	9-track magtape (800 b/in)	QJS92-XD
	9-track magtape (1600 b/in)	QJS92-XM
	RL01	QJS92-XQ
RT11	9-track magtape (800 b/in)	QJS91-XD
	9-track magtape (1600 b/in)	QJS91-XM
	RL01	QJS91-XQ
	RX01	QJS91-XY

DECType

DECType is a full-featured word processing package designed to run on the CTS-300, RSX-11M-PLUS, Micro/RSX, and VMS operating systems, permitting concurrent word and data processing in a multiuser environment. DECType provides industry-standard features such as menu-driven operation, cut and paste, forward and reverse scrolling, search and replace, automatic wordwrap, subscripts, superscripts, headers, and footers.

In addition, DECType provides a basic four-function editor math utility, user-defined keys for predetermined repetitive operations, and abbreviation and paragraph libraries, as well as the ability to cancel an editing session without changing the document.

DECType gives the user full control of printers. Users can remove documents from the print queue, change the print priority of a document, view the list of documents in the queue, and view the status of all defined printers.

DECword/DP

DECword/DP gives fully-featured word processing to RSTS/E and Micro/RSTS users. It can be run from any VT100 terminal on a RSTS/E or Micro/RSTS system and gives end users the type of text-manipulation features usually associated with stand-alone word processors.

DECword/DP provides such industry-standard features as menu-driven function selection, cut and paste, forward and reverse scrolling, global search and replace, and automatic wordwrap. It also offers a variety of advanced features: automatic footnoting, spelling-error detection, list processing, and computer-aided instruction for using its software.

Micro/RSX DECType

Micro/RSX DECType is a DECmate-style word processor providing most of the features of DECmate or WPS-8. Experienced WPS or DECmate users can begin using Micro/RSX DECType immediately. Micro/RSX DECType supports the WPS keyboard, so Micro/RSX DECType users can execute most of the editing functions just as they would when using DECmate or WPS-8. Micro/RSX DECType documentation is organized and formatted to closely resemble WPS documentation. Users will be able to quickly learn any features unique to Micro/RSX DECType; WPS or DECmate users do not need to retain to use Micro/RSX DECType.

Micro/RSX DECType permits concurrent word and data processing in a multi-user environment which extends a data processing system with word processing capabilities. The Micro/RSX DECType editor creates and maintains documents stored on the full range of disk devices supported by Micro/RSX/VMS. Storage available for documents will vary depending upon other data storage requirements on the same disk media.

SPD Number:

18.14.xx

DX/11M is a software package that makes asynchronous communication possible between an RSX-11M system and the WPS-8 word processing system. Communication between the RSX-11M system and the WPS-8 system uses the DX error-correcting protocol. The WPS-8 system appears to the host application programs to be a normal terminal.

DX/11M effectively enables distributed stand-alone WPS-8 systems and the host RSX-11M realtime multiprogramming system to be linked together for better system utilization and data sharing. The DX/11M package includes utility programs that convert RSX-11M files stored in word processing format to RSX-11M files stored in ASCII format, and vice versa.

SPD Number:

10.96.xx

A-to-Z Word Processing

See description under **A-to-Z Software**.

DECdx

DECdx is a software package executing on the PDP-11 RSTS/E timesharing system that makes asynchronous communication possible between a RSTS/E host and a current WPS-8 word processing system. Communication between the RSTS/E system and the WPS-8 system uses the DX error-correcting protocol. The WPS-8 system appears to the host application programs to be a normal terminal.

DX/RSTS effectively enables distributed stand-alone WPS-8 systems and the host RSTS/E timesharing system to be linked together for better system utilization and data sharing. The DX/RSTS package includes utility programs that convert RSTS/E files stored in word processing format to RSTS/E files stored in ASCII format, and vice versa. This is available for RSTS/E and RSX-11M-PLUS and replaces DX/RSTS. DX/RSTS-to-DECdx conversion included.

A-to-Z Integrated System

The A-to-Z Integrated System is a user-installable multiuser base system which will support up to eight concurrent users. The A-to-Z Integrated System includes menu-driven system management functions as well as the ability to install and remove Micro/RSX applications. Inherent in the system are the menu manager and flow-control processor, which insulate the end user from the system-level interface without isolating the developer or system manager from the functions available at Micro/RSX command level. The A-to-Z Integrated System includes the Micro/RSX operating-system software (for which a separate PDP-11 General License is required) as well as the right to use Micro/RSX DIBOL on the system. The Micro/RSX documentation option, Micro/RSX DIBOL distribution option, and Micro/RSX DIBOL documentation option are available as separate products.

A-to-Z Integrated System is only available on MicroPDP-11 systems and only supports VT200 family terminals.

SPD Number:

18.16.xx

A-to-Z Data Inquiry

A-to-Z Data Inquiry is a software product designed to create inpromptu reports and terminal queries from existing data files, as well as create and modify new databases. Through the use of English-language-like commands, a novice user can design the desired output without the need for programming. A-to-Z Data Inquiry uses dictionaries to describe data files. Logical field names assigned to each field are used with A-to-Z Data Inquiry commands to extract the desired data. A data entering facility is available to allow the user to create simple databases.

Dictionary Features

- Overlaid field description redefines physical areas in the file.
- Definition of secondary and tertiary dictionaries permits three files to be used as if they were one.
- Supports COBOL, BASIC, FORTRAN, and DIBOL.
- A password can be assigned to restrict access to privileged users. To use the dictionary the user must identify the password upon system prompt.
- A data file can have multiple dictionaries, which define the file in various formats for different users.

Through the use of relational, arithmetic, and boolean expressions, the user locates desired records in the data file. A-to-Z Data Inquiry establishes a collection of pointers to the desired records. The pointers can then be sorted in a new sequence by one or more fields. After a collection has been established and optionally sorted, the operator can then create a query, report, graph, and/or an A-to-Z Word Processing list document. Optional defaults assist in creating simple queries and reports. Math functions enable new temporary fields to be created for output.

A-to-Z Data Inquiry can create a procedure file consisting of a sequence of commands, to produce the desired output. This file of commands can then be executed to produce similarly formatted output from current sets of data. The file can be called interactively or by another program. The ability to bypass, add, and delete commands in the file is achieved through a "prompt" mode during interactive execution.

SPD Number:

18.17.xx

Order Number:

QY952-xx

A-to-Z Word Processing is a DECmate-style word processing application providing most of the features of DECmate or WPS-8. Experienced WPS or DECmate users can begin using A-to-Z Word Processing immediately. A-to-Z Word Processing supports the WPS keyboard, so users can execute the editing functions as they would when using DECmate or WPS-8. A-to-Z Word Processing documentation is organized and formatted to closely resemble WPS documentation. Users will be able to quickly learn any features unique to A-to-Z Word Processing. WPS or DECmate users will not need to retain to use A-to-Z Word Processing.

A-to-Z Word Processing permits integrated word and data processing in a multi-user environment that extends a data processing system with word processing capabilities. The A-to-Z Word Processing editor creates and maintains documents stored on the A-to-Z Integrated System. Storage available for documents will vary depending upon other storage requirements.

A-to-Z Word Processing facilitates the ability of creating compound documents. Reports and/or graphs from the other A-to-Z applications may be imbedded into documents.

SPD Number:

18.18.xx

A-to-Z Business Graphics

A-to-Z Business Graphics is an interactive business graphics application which enables the nontechnical user to create business graphs. Aided by picture assisted menus, a user is able to input the data to be graphed, design the graph description, and combine this information to create a graph file for display on video terminal or printer. In this manner, the data, design, and graph files are maintained independently. This permits modified or new data files to be used with a previously designed graph. Graphs may be created and stored on a file for future use.

A-to-Z Business Graphics uses the capabilities of graphics terminals and graphic-mode printers. On monochrome terminals, graphic images can be represented in black-and-white formats with the use of selected fill and line patterns. On color terminals, graphs can be designed with four colors chosen from a list of fourteen available colors.

An application can also be written to access data files and establish an A-to-Z Business Graphics data file. A-to-Z Business Graphics can create the following 12 graph types:

- Vertical bar
- Horizontal bar
- Vertical clustered bar
- Horizontal clustered bar
- Vertical stacked bar
- Horizontal stacked bar
- Simple line
- Shaded line
- Scatter
- Scatter with trend line(s)
- Pie
- Pie with exploded segments

SPD Number:

18.19.xx

A-to-Z Integration Kit is designed to allow the creation or migration of software packages targeted for the A-to-Z Integration System. A-to-Z Integration Kit provides the necessary software routines to create and maintain A-to-Z Data Inquiry. The A-to-Z Integration Kit allows the user to create and modify menus for user-written applications with all the functionality of the menus used in other A-to-Z components.

Features

- A-to-Z Integrated System menu compiler for ease of menu creation and modification.
- A-to-Z Integrated System menu subroutines for use by user applications.
- Utility for creation, modification, and printing of data dictionaries, allowing access to the application data through A-to-Z Data Inquiry.
- Definition and suggested use of the A-to-Z Integrated System Function Keys.
- Definition and requirements for the creation of A-to-Z Integrated System installation files.
- Definition and the use of callable interface for A-to-Z Integrated System software routines

SPD Number:

18.20.xx

A-to-Z Document Transfer

A-to-Z Document Transfer is a facility that allows word processing documents to be moved between A-to-Z Word Processing and DECmate word processing systems. A-to-Z Document Transfer utilizes the DECdx protocol and is compatible with DECdx or other systems.

SPD Number:

18.31.xx

A-to-Z Electronic Mail

A-to-Z Electronic Mail provides the A-to-Z user with the ability to send, receive, file, and forward mail messages with other A-to-Z users. A-to-Z Electronic Mail requires A-to-Z Word Processing since it is used as the mail editor.

A user can send A-to-Z word processing documents and/or reports to other A-to-Z users by selecting an option off the menu. A-to-Z Electronic Mail utilizes mail folders so that mail that has been received can be filed into user-specified folders for quick retrieval.

If Micro/RSX DECnet has been installed on the A-to-Z system, A-to-Z Electronic Mail will enable multi-node mail capabilities.

SPD Number:

18.26.xx

A-to-Z Software Ordering Information

Product	Options				
	Single-Use License	Distribution and Documentation	Software Revision Right-To-Copy	Documentation Only	Installation Service
A-to-Z Business Graphics QY953 SPD 18.19.xx	UZ	H3	HZ	GZ	I3
A-to-Z Data Inquiry QY952 SPD 18.17.xx	UZ	H3	HZ	GZ	I3
A-to-Z Integrated System QY950 SPD 18.16.xx	UZ*	H3	HZ	GZ	I3
A-to-Z Word Processing QY951 SPD 18.18.xx	UZ	H3	HZ	GZ	I3

Multiuser Digital Accounting System

Introduction

The Multiuser Digital Accounting System is a general accounting package described for small businesses in the United States. Version 2.0 can be installed on a MicroPDP-11 as a standalone system or as a menu option on the A-to-Z Integrated System. The complete package consists of a prerequisite starter kit and seven integrated accounting modules:

- General Ledger
- Payroll
- Accounts Payable
- Accounts Receivable
- Inventory Control
- Order Entry
- Sales Analysis

With the exception of Order Entry and Sales Analysis, all of the modules can be interfaced with General Ledger or used independently.

For ordering information consult *Software Product Description (SPD)* for Multiuser Digital Accounting System 18.25.xx.

MicroPower/Pascal-Micro/RSX

MicroPower/Pascal-Micro/RSX is a modular software development package for microcomputer applications. It includes a high-performance optimizing Pascal compiler and tools to create, build test, and debug concurrent realtime application programs running under the Micro/RSX operating system. The user can create these applications on a Micro PDP-11 host system for execution on a different target microcomputer, which can be any Digital Q-bus or Extended Q-bus processor from the FALCON SBC-11/21 to the PDP-11/23-PLUS. Each application is constructed especially for its target system, with the exact set of operating-system services needed.

MicroPower/Pascal-Micro/RSX is particularly suited for such dedicated, realtime microcomputer applications as process control, instrumentation, and robotics. An optimizing compiler produces fast, compact object code compatible with any Digital Q-bus PDP-11 microcomputer.

Two-Processor Development Environment

Micropower/Pascal-Micro/RSX uses a two-processor development environment: a host Micro PDP-11 running Micro/RSX operating system, where the Pascal compiler and development utilities reside and execute, and a target Q-bus PDP-11, where the application program resides and executes. This provides the most effective work environment for developing target-system programs. A user can transport the final application program to the target microcomputer by one of three methods. The methods include writing it into read-only memory (ROM); downline-loading it over a serial line; recording it on a floppy disk, tape, or cartridge or bootstrapping on the target system.

Concurrent Execution Capability

Concurrent execution means the Pascal source code is structured into independent parts called processes, which appear to execute simultaneously. Each process cooperates with all other processes in manipulating such shared resources as memory and peripheral devices.

Customized System Routines

A modular runtime system software package that includes a library of executive service modules (modular operating system) is one of the major components of MicroPower/Pascal-Micro/RSX. By selecting only the appropriate components of MicroPower/Pascal-Micro/RSX Runtime System software and merging them with suitable user-written software, users can create a highly streamlined software package for their applications. This application software will run stand-alone on the target runtime system; no other operating system is needed. MicroPower/Pascal-Micro/RSX automatically selects those operating-system services that application requires from a library in the Micro PDP-11 host computer and places them in an executive module. By including only required system services, the module and the application it supports make the most efficient use of the target runtime system hardware. Further, the modular runtime system is Rommable, which eliminates the need for mass storage in the target system.

For ordering information, consult *Software Product Descriptions (SPD)* for MicroPower/Pascal-Micro/RSX 18.24.xx.

A-to-Z Integration Kit

See previous description under A-to-Z Software.

The Professional Host Tool Kit lets programmers use RSX-11M, RSX-11M-PLUS, and VAX/VMS systems to develop application programs for Digital's Professional 300 Series personal computers. With the software and optional hardware included in the package, application programmers using their current PDP-11 systems can create and debug applications compatible with the Professional's P/OS menu-driven environment. This results in higher programmer productivity, less required training time, and preservation of current system investments. The Tool Kit is useful for software houses, DP departments, and other organizations that want to produce applications using all the unique features of the Professional series.

Included in the toolkit are the MACRO-11/Professional, DIBOL/Professional and programming languages, the RMS/Professional Record Management System, FMS/Professional for forms-oriented video I/O management, the SORT/Professional record sorting utility, the Professional Graphics Package for over 20 device-independent graphics commands, and the Professional Diskette Builder for end-user media distribution. The Pro/Host Toolkit FORTRAN-77 Debugger can be purchased separately to debug FORTRAN-77 and MACRO-11 programs that compile successfully. Applications are developed and debugged on the host PDP-11 system, then transferred to a Professional 350 system to run.

The toolkit is a prerequisite for using Pro/Host Toolkit BASIC-PLUS-2, Pro/Host Toolkit COBOL-81, and Pro/Host Toolkit FORTRAN-77.

DECmail-11

See description under Electronic Mail

PDP-11 ADE/RSX

PDP-11 ADE/RSX is a nonprogrammer's development software package for small applications requiring processing of character, numeric, and data-oriented information. The product is designed specifically as a productivity tool for use by nontechnical personnel, and runs under the RSX-11M and RSX-11M-PLUS operating systems. It allows users to create their own information base; add, change or delete data; perform calculations on data; produce simple bar graphs; and write and print reports.

PDP-11 ADE/RSX uses commands, verbs, and reports for application building, processing, and report printing. It assigns a temporary file, called a "worksheet," which the user fills with data through the video terminal and then files (SAVES) on the system as a table. The data is displayed on the terminal in a columnar format, and various commands can be used to manipulate the information.

ADE/RSTS

ADE (Applications Development Environment), a programming tool specifically designed so nonprogrammers can develop and run small, simple applications for use in small businesses, allows users with little or no computer experience to perform such record-keeping and bookkeeping tasks as maintaining and printing mailing lists, inventory lists, time sheets, and budgets. ADE runs in the RSTS/E and Micro/RSTS timesharing environments.

ADE presents on a user's video terminal electronic worksheets made up of rows and columns. Users work with these worksheets by writing procedures—simple programs using English verbs. Procedures can store or retrieve information from worksheets in tables kept in disk files, manipulate the entries in a worksheet, or print out reports. An interactive help command, continuous display of available commands and messages at the bottom of the terminal screen, and interactive command prompting step users through using ADE.

RTEM-11 provides the RT-11 program development environment on RSX-11M, RSX-11M-PLUS, and VAX/VMS. RTEM-11 runs in compatibility mode on VAX/VMS systems. It allows several users to develop RT-11 applications concurrently on a host system. The number of users is dependent on CPU power and system activity. Application programs can be created, edited, assembled, linked and debugged on RTEM-11 and then executed on an RT-11 system. The minimum memory requirement for RSX-11M or RSX-11M-PLUS systems is 48 Kbytes.

MENU-11

MENU-11 allows application programmers and system managers to design customized interfaces between a RSTS/E or Micro/RSTS system and its users. Unrelated applications can easily be tied together to make complete functional environments on a per-user or per-site basis. RSTS/E's DCL command-language environment can be sealed off from novice or infrequent users and replaced with a set of interactive menus backed by help texts. Programmers design the menus and help texts, giving users access to just those procedures and utilities needed in their work. This makes MENU-11 ideal for turning a RSTS/E system into a "turnkey" application system, as well as for providing security on a system with many inexperienced users.

MENU-11 consists of a set of programs that interact with RSTS/E or Micro/RSTS and that control the display of menus to users according to prepared command files. The command files specify the format and content of menus, the help text associated with each menu option, the actions to be taken when an option is chosen (including conditional execution of actions), the transfers between different menus; and the interactions with the user to gather more information. Menu options can execute system commands, run application programs, and generally perform any action or series of actions that is possible under RSTS/E.

**KMS11 RSX X.25 LAPB
Link Level Software**

The KMS11 X.25 LAPB Link-Level Software is a software/firmware package consisting of basic X.25 LAPB link-level firmware for the KMS11-BD or KMS1P-M, a firmware loader to load the firmware into the KMS11 hardware, RSX-11 device driver for a KMS11-BD or a KMS1P-M communications controller, and a demonstration program.

The driver, in conjunction with the X.25 LAPB link-level firmware, allows the RSX-11 user to perform high-speed, synchronous, X.25 link-level communication in a point-to-point environment. The driver provides the interface that allows for transfer of command, control, and data information to and from the RSX-11 user task, KMS11-BD or KMS 1P-M X.25 LAPB link-level firmware and remote end communications line. The KMS11 driver is full-duplex and maintains internal queues, enabling the supplied firmware to control eight receive and eight transmit buffers per line, concurrently.

If the user's application runs on a system with 22-bit mapping enabled, a separate partition should contain all buffers. This can be either a common area or a partition in which the task(s) will be installed.

SPD Number:

13.42.xx

The KMV11 X.25 LAPB Link-Level Software is a software/firmware package consisting of basic X.25 LAPB link-level firmware, a firmware loader, a device driver for a KMV11-A Q-BUS communication controller, a demonstration test program, a trace dump module and a trace interpreter.

This package allows the RSX-11M, RSX-11M-PLUS, or RSX-11S Operating-System user to perform high-speed, synchronous communications in a point-to-point environment.

SPD Number:

13.43.xx

KMV11-A HDLC Framing Software

The KMV11-A HDLC Framing Software is a package of basic HDLC/SDLC framing firmware, a firmware loader and an RSX-11M, RSX-11M-PLUS or RSX-11S device driver for the KMV11-A programmable communications controller. The driver, in conjunction with the HDLC/SDLC framing firmware, loader, and the KMV11-A hardware, allows the RSX-11M, RSX-11M-PLUS, or RSX-11S Operating-System user to perform medium-speed, synchronous communication in a point-to-point or multipoint environment. The driver provides the interface for transfer of command, control, and data information to and from RSX-11M, RSX-11M-PLUS, or RSX-11S, the KMV11-A basic HDLC/SDLC framing firmware, and remote end communications line.

The KMV11-A driver is full-duplex and maintains internal queues, enabling the supplied firmware to control two receive and two transmit buffers at the same time, allowing for the most efficient use of the device during transmission and reception of data.

SPD Number:

14.22.xx

KMV11-A Development Tools

The KMV11-A Development Tools consist of a Software/Firmware package that facilitates the development of layered telecommunications protocols in the KMV11-A communications controller. The KMV11-A operates under the RSX-11M, RSX-11M-PLUS or RSX-11S Operating System, and should be used by programmers who have MACRO-11 skills.

The KMV11 tools package contains firmware routines written in MACRO-11. This firmware resides in the KMV11-A ROM implementing the Communication Executive functionality. The ROM-resident firmware consists of the power-up code, the communication executive routines, and the self-test routines to detect hardware malfunctions. Indirect command files are included to assist the user in assembling and linking user-developed firmware.

To facilitate the user development effort the following set of utilities is included: A "Linker" which allows the user to create a working image from the user-written source programs; a "Loader" to load into the KMV11-A RAM the file created by the linker; a dump analyzer, so files created by the unload function of the debug utility can be formatted and dumped to a disk; and a debug utility program, which enables a programmer to interactively debug KMV11-A firmware.

SPD Number:

13.41.xx

**Applications Packages
Ordering Information**

Product	Order Code (SPD Number)				
	RT-11	RSTS/E or Micro/RSTS	RSX-11 M/ M-PLUS	CTS-300	Micro/RSX
ADE	-	QR530-HM, HH, UZ, H3 (13.11.xx)	-	-	
BCP	-	-	QJS05-AD, AM, AQ, AY, AH (14.72.xx)	-	
DATATRIEVE-11	-	QP300-HM, HH, UZ QY300-HM, HH, UZ (12.48.xx)	QP301-HM, HH, UZ QY301-HM, HH, UZ (12.48.xx)	-	
DECgraph-11	-	QJA10-HM, HH, UZ (15.24.xx)	-	-	
DECtype	-	-	QR038-HZ, UZ (M-PLUS)	QJ038-HH, HX, UZ (13.15.xx)	QY038-H3, HZ, UZ
DECword/DP	-	QR480-HM, HH, UZ (13.14.xx)	-	-	
FMS-11	QJ713-HM, HH, UZ (12.22.xx)	QJ716-HM, HH, UZ (13.17.xx)	QJ715-HM, HH, UZ (12.27.xx)	-	
MENU-11	-	QR690-HH, HM, UZ, H3 (12.60.xx)	-	-	
PLXY	QJS91-XD, XM, (12.42.xx)	QJS92-XD, XM, XQ (14.16.xx)	QJS90-XD, XM, (14.71.xx)	-	
Professional Tool Kit	-	-	QJ071-AM, AH (40.2.xx)	-	
QUILL	-	-	-	QJA09-HZ, UZ (12.55.xx)	
RGL	QJ122-HH, UZ (14.62.xx)	-	QJ123-HM, HH, UZ (14.62.xx) (RSX-11M only)	-	
RTEM	-	-	QJ291-HM, HH, UZ QJ304 (30.21.xx)	-	
PDP-11 SORT/MERGE	-	-	QP602-HM, HH, UZ (12.7.xx)	-	
MicroPower/ Pascal-RSX			QP029-HD, HH, HM, HV, UZ (14.83.xx)		
MicroPower/ Pascal- Micro/RSX					QY029-H3 (18.24.xx)

DECmail-11

DECmail-11 is an easy-to-use, full functionality command driven electronic mail system. It is now available on RSTS/E, Micro/RSTS, RSX-11M-PLUS and Micro/RSX.

Commands are in the English language. You would "Read" to read a message, "Send" to send a message, "List" to display a directory of messages in a file folder, "Answer" to reply to a message, and "File" to store a message in a file folder.

Commands such as "Next," "Previous" and "Last" allow the user to move through a large number of messages easily. Commands can be abbreviated as the user becomes more familiar with the system's operation. Users can define their own names for commands or strings of commands, to suit their needs or to make commands compatible with those used on other systems. A quick reference card and an extensive online help facility are included to aid the novice user in becoming productive quickly.

Some of the functionality available to the user is to create, edit, forward, or store messages, search by date and/or subject key string, retrieve messages held in user folders, define command names, defaults, command sequences, print, transfer data to the native file system, and use on-line help. Users can choose the EDT text editor.

Multimode Operation

When DECmail-11 is used with the optional DECnet products, these features can be accessed in a multimode environment to communicate with the VMS MAIL facility and other nodes running DECmail-11.

People's names can be defined by the system manager or individual users to hide references to network locations entirely.

If the optional product Message Router is used, DECmail-11 can communicate with DECmail on VAX.

SPD Number:

13.19.xx

A-to-Z Electronic Mail

See previous description under A-to-Z Software.

A-to-Z Document Transfer

See previous description under A-to-Z Software.

Principles

Software is treated as proprietary information. Customers do not own it, but are licensed to use it under the terms and conditions of software license agreements. Key points of Digital's software binary license agreements are:

- Customers must have a binary license to use any Digital binary software products.
- This license allows *one* customer to run *one* software product on the CPU on which it is first installed.
- Digital retains title and ownership.
- Digital's licensing agreement does not allow the transfer of software from one end user to another, or from one CPU to another without prior permission from Digital. Software may only be transferred to another party with written permission from Digital.
- A customer may reproduce the software, if necessary, but only for use on the specific CPU licensed to use it.
- The use of an updated version of the software on the licensed CPU requires that the customer purchase a software update option, if not covered by a software service contract.
- The software may be used on another single CPU, on a temporary basis during a malfunction of an original CPU that causes the software to be inoperable.
- Any modification to Digital-licensed software does not exempt the software product from Digital licensing or sublicensing terms, conditions, or fees. Only those modifications that are not part of the original software are the customer's property.

Software Ordering Options

This standard binary license includes a 90-day limited warranty.

Software Product Update Option

A customer with a binary license may order a product update for each licensed CPU. An additional fee is charged for each product update and for each one-time right to copy the update for each licensed CPU.

The Digital Network Architecture (DNA), developed by Digital, defines an integrated set of networking capabilities. DNA supports a broad range of compatible networking options that can link together realtime systems, timesharing systems, word processing systems, computational systems, and data processing systems into one network. Such a network can increase productivity and improve an organization's control over day-to-day operations.

The layered structure of DNA can accommodate newer communication technology, such as Ethernet, while preserving the application investment of Digital's customers. Today DNA Phase IV supports Digital Data Communications Message Protocol (DDCMP) for point-to-point and multipoint communications, Ethernet protocols for local area networks, and X.25 for communications over public packet-switched networks.

Local area networks (LANs) offer reliable high-speed communications channels for connecting information processing equipment in a limited geographic area—an office, a building, a complex of buildings, or campus, for example. LANs are optimized for high-speed (greater than one million bits per second) data transfer. Usually they are privately owned.

Ethernet is a local area network specification for communications protocols developed jointly by Xerox, Intel, and Digital. Digital's Ethernet program for local area networking extends the possibilities for effective communication and resource-sharing within the framework of DECnet. This catalog lists the types of cables and cable interface connectors, transceivers, and communication controllers. Digital continually strives to build other capabilities needed to link these networks with remote networks, public packet-switched networks, and SNA networks, all within the framework of the Digital Network Architecture.

Communications Software

Digital's network software groups include:

- DECnet for Digital-to-Digital system communication, locally or remotely.
- Internets for connecting Digital systems to non-Digital systems.
- Packetnet for connecting systems using a public packet-switched network.

When used in conjunction with the various communications hardware offerings, Digital's network software offers powerful capabilities for integrating an organization's operations, whether it be a manufacturing, university, office, or engineering application.

Networking Selection Chart

Network	Software Communications Products
DIGITAL-to-DIGITAL Host Communication	
Local Traditional	All DECnet Layered Software
Local Area Networks	DECnet-VAX DECnet-RSX-11M DECnet-RSX-11M-PLUS
Remote	All DECnet Layered Software RSX-11 PSI VAX PSI TOPS-20 PSI
DIGITAL-to-nonDIGITAL Host Communication	All Internets RSX-11 PSI VAX PSI TOPS-20 PSI DECnet/SNA Gateway

Introduction

DECnet is a family of software products that enable two or more Digital computer systems—the 16-bit PDP-11s, the 32-bit VAX computers, and the 36-bit DECsystem-10s and DECSYSTEM-20s—to form a network. At each node, DECnet acts as an interface between the node's operating system and the network. Each operating system's DECnet software formats data and procedures according to a set of protocols described in the Digital Network Architecture (DNA) specifications. Each DECnet system then converts received data into formats for that operating system. The DNA specifications are nonproprietary and can be ordered from your Digital Sales Representative.

DECnet offers a wide range of networking functions, over and above the data communications protocol, which support a wide range of application strategies. Occasional updating of remote files using remote resource-sharing facilities, and the transferring of entire files from one system to another for intensive modification are just two of the features which can be selected to help optimize productivity.

Features

- *Task-to-task communication*—enables two programs to exchange information. The two programs can be running under different operating systems and can be written in different languages.
- *File transfer*—exchange of sequential ASCII or binary files. DECnet handles compatibility issues among operating systems. The transfer of filetypes other than sequential ASCII and binary may also be supported between particular operating systems. Check with your Digital Sales Representative for details.
- *Remote command file submission and execution*—one system can direct another to execute a specified program, either resident on the remote system or sent to the remote system as a part of the request.
- *Downline loading*—programs or whole software systems can be developed on a node with the necessary peripherals and transferred to another node for execution to a small memory-only system, for example.
- *Virtual command terminal*—a terminal user physically connected to one system can logically connect to another system and act as if directly connected to that system.
- *Adaptive routing*—DECnet products communicate via a user-defined “least cost” path and have the ability to detect and automatically route around line or system failures.
- *Network management*—tools for monitoring and controlling network operation. These tools include facilities for tuning network parameters; for logging events; and for testing nodes, lines, modems, and communication interfaces. For monitoring network operation or for testing a new network application, DECnet provides statistical traffic and error information. Access to such network performance information allows potential problems to be solved before they degrade network performance.

Configuring a DECnet Network

A DECnet network can be configured so that each network member is fully connected with every other member or so that some nodes communicate with other network nodes through intermediate or routing nodes. Adaptive-path routing means that the DECnet products in a routing network communicate via a user-defined “least cost” path, but can also detect and route around line or system failures.

DECnet nodes can communicate with adjacent nodes over synchronous and asynchronous communications lines and parallel interfaces. DECnet nodes can share a communication link in a multipoint configuration, thereby reducing the high cost of multiple, directly connected communications lines. Microwave and satellite links (neither is available from Digital) are also used to connect DECnet nodes.

DECnet-11M and DECnet-11M-PLUS (as well as DECnet-VAX and DECnet-20) nodes can communicate with each other with full DECnet functionality across a public packet-switched network when used with the Packetnet System Interface (PSI) products discussed later in this section.

Consult the *Software Product Descriptions (SPDs)* before ordering networking software and supporting hardware. Your local Software Services Network Specialist can ensure that your proposed network configuration will meet your particular networking requirements.

DECnet

DECnet allows a suitably configured system to participate as a routing (full function) or nonrouting (end) node in DECnet computer networks. DECnet offers task-to-task communications, utilities for network file transfer, heterogeneous network command terminal support, and network resource capabilities, using the Digital Network Architecture (DNA) protocols. DECnet communicates with adjacent nodes over synchronous and asynchronous communication lines and parallel interfaces. Phase IV networks of over 64,000 nodes are possible, as is communication using the Ethernet specifications and protocols. Communication using X.25 circuits over selected public packet-switched networks is also possible, when it is configured with the appropriate PSI product.

Consult the *Software Products Descriptions (SPDs)* for more information on each DECnet product. Each DECnet product offers its own level of functionality and its own set of features to the user. Users should also note that the functions available depend, in part, on the configuration of the rest of the network.

CAPABILITY	DECnet PRODUCTS (SPD NUMBER)							
	-RT (10.72.xx)	-11M (10.75.xx)	-11S (10.74.xx)	-11M-PLUS (10.66.xx)	/E (10.73.xx)	-IAS (10.74.xx)	-VAX (25.3.xx)	-20 (23.2.xx)
PROGRAM-TO-PROGRAM	✓	✓	✓	✓	✓	✓	✓	✓
NETWORK COMMAND TERMINAL	✓	✓	✓ ¹	✓	✓	✓	✓	✓
FILE TRANSFER	✓	✓	✓	✓	✓	✓	✓	✓
COMMAND/BATCH FILE SUBMISSION	✓ ²	✓		✓	✓	✓	✓	✓ ³
COMMAND/BATCH FILE EXECUTION	✓ ²	✓	✓		✓	✓	✓	✓
REMOTE FILE ACCESS	✓	✓	✓ ⁴	✓	✓	✓	✓	
DOWN-LINE SYSTEM LOADING		✓		✓		✓	✓	
DOWN-LINE TASK LOADING		✓		✓		✓	✓	

NOTES:

¹ DECnet-11S does not support connection from remote command terminals.

² Requester-only function.

³ Server-only function.

⁴ Offers local users network access to remote file systems. Does not allow users on remote systems to access local files.

Product Information

Internets comprise a family of products that connect Digital systems to computers built by other manufacturers. Digital's protocol emulator (PE) products provide a way for computers and terminals to communicate with those built by IBM, CDC, and UNIVAC. Digital's wide range of Internet PEs allows you to choose mainframes and minicomputers on the basis of your application needs.

Digital's Internet products are data transfer facilitators, not hardware emulators. Digital's goal is to enable the exchange of data by using common communication protocols, not to provide plug-compatible replacements for terminal subsystems.

Digital-to-IBM Communication

Digital offers a full range of Digital-to-IBM Internet products. These products help users in implementing cross-vendor cooperative computing applications that span centralized and distributed processing environments. PDP-11 operating systems support program-to-program communication as well as 3270 terminal emulation and remote job entry (RJE). Installation, troubleshooting, and network-control facilities help minimize the problems of bringing up and maintaining effective internetwork operations.

2780/3780 Protocol Emulators

It emulates the communication protocol of an IBM 2780 device while running as a user job under a suitably configured UNIBUS-based RSTS/E system. It will transmit files from any input medium (video or hardcopy terminals, disks, tapes, and cardreaders) and receive files for any medium supported by RSTS/E. Files can print on any lineprinter supported by a RSTS/E operating system.

The 2780/3780 PEs are BISYNC RJE emulators that allow files or jobs to be transferred between PDP-11 systems and IBM hosts supporting either the IBM 2780 or 3780 protocol. Multiple lines and multiple users are supported concurrently through operator and program control.

Dedicated or switched point-to-point lines can be used. Autoanswer is supported for switched lines. Operator control is performed using the standard Digital Command Language directives. Indirect command files can be used to minimize operator interaction or to facilitate completely unattended operation. Monitoring functions include continuously maintained traffic and error counters as well as on-demand status reporting, and there are troubleshooting facilities for loopback testing.

RT-11 2780/3780 Emulator

The RT-11 2780/3780 Emulator provides communications capabilities similar to IBM 2780 and 3780 remote batch terminals.

The emulator runs under the RT-11 Foreground/Background (FB) or Extended Memory (XM) monitor as either a foreground or background job. The emulator accepts commands interactively or from indirect command files. Commands are provided for unattended operation. The emulator supports operation of a single full- or half-duplex, synchronous, point-to-point line. Support for automatic answer to incoming calls is also available for use with those modems that provide this capability.

PRO-2780/3780, an application for the Professional 300 Series computers, provides communications to systems with capabilities similar to IBM 2780 and 3780 remote batch terminals. The product runs under the P/OS hard disk operating system.

PRO-2780/3780 operates using a single, point-to-point communications line. This line can be either switched or dedicated communications lines, and transmission speeds of up to 9,600 bits per second half duplex (on dedicated lines) can be achieved on an otherwise idle system.

The user interacts with the product by means of the P/OS standard user interface of menus and forms. The product also provides the user with information that describes the product and its menus.

**3271 Protocol Emulators
(Interactive BISYNC)**

RSX-11 and RSTS/E 3271 Protocol Emulators provide facilities for both program-to-program interactive communication and data pass-through 3270 terminal emulation. Terminal users and application programs are able to exchange data with a program running under IMS or CICS or TSO on an IBM 370 or 303X host. The PDP-11 system appears to the host as an IBM 3277 Model 2 terminal and 3271 Model 2 control unit connected to a multidrop synchronous line. The PE module supports up to six synchronous lines (coresidency of RSX-11 3271 and either RSX-11 DECnet or RSX-11M/SNA PE is not supported).

The terminal emulation facility transforms VT100 terminals attached to a PDP-11 into virtual 3270 terminals so that a single terminal can be used interchangeably to access both Digital and IBM systems. The RSX-11 3271 Protocol Emulator allows the system manager to predefine all parameters required to connect to specified IBM applications. Once the user invokes the emulator, the terminal appears to be connected to an IBM network. Returning the terminal to normal VT100 operation after an Internet session requires just a one keystroke.

**RSX-11M-PLUS RJE/HASP
Emulator**

The RSX-11M-PLUS RJE/HASP Emulator is a software package that performs the standard functions of an IBM HASP Remote Job Entry Workstation. It operates as a set of tasks under the RSX-11M-PLUS operating system.

The emulator provides multileaved (pseudosimultaneous, bidirectional) communication of up to seven input and seven output data streams. The number of input and output streams accommodated by the emulator is fixed at assembly time. The operator can assign operating supported devices to data streams on a per-file or temporarily dedicated basis.

It performs the standard functions of an IBM HASP remote job entry workstation. Digital's HASP product mimics the CRT and keyboard of the HASP workstation by offering remote console support. In addition to using the features of the 2780 and 3780 emulators, the HASP PE user can communicate directly with the IBM mainframe from a local terminal to control and check the status of jobs on the IBM host.

RJE/HASP

It provides multileaved (pseudosimultaneous, bidirectional) communication of up to seven input and seven output data streams. Standard HASP protocol features include data compression of repeated sequential characters, including blanks, full EBCDIC transparency, multileaving, and support of printer vertical forms to skip to channel 1 (top of form). Communication-line control is performed directly by one of the RJE/HASP tasks. Concurrent use of the communications device by other RSX-11M or RSX-11M-PLUS tasks is precluded. Any mass-storage device or unit record device supported by RSX-11M or RSX-11M-PLUS can be used as a source or destination of data for a HASP data stream.

RSX-11M/SNA Protocol Emulator

It furnishes an RSX-11M system with the ability to participate in an IBM Systems Network Architecture (SNA) network. RSX-11M/SNA PE enables the RSX-11M user application programs to communicate with IBM application programs or system services on a task-to-task basis. Three modes of application programming support are offered to fit varied customer expertise and requirements: Emulator Control (EC), Extended Emulator Control (XEC), and Application Control (AC).

RSX-11M/SNA PE supports up to four half-duplex or full-duplex synchronous lines at speeds up to 9600 bits per second. The emulator will allow up to a maximum of 32 user sessions. The supported communications devices are DUP11 or KMC11 with DUP11s (coresidency with DECnet-11M or with RSX-11/3271 is not supported).

DECnet/SNA Gateway

Through the DECnet/SNA Gateway, a network of Digital systems can share information with a network of IBM systems running under SNA.

With access routines for remote job entry, 3270 terminal emulation, and/or the application program interface, users of Digital systems in a DECnet network can access corporate-based information, transmit local data to a corporate database, and provide local access to applications available within the SNA network. Not only is the Gateway's operation transparent to the users in the DECnet environment, but as a shared network resource it eliminates the redundancy that would be necessary if each DECnet node communicated directly with the SNA network.

The UN1004/RSX/UNIVAC 1004 Terminal Emulator provides communication between a UNIBUS-based RSX-11M system and a UNIVAC 1100 series or other system using the UNIVAC 1004 RMS-1 communications protocol. The software provides remote job entry (RJE) terminal emulation through which the user can send data in 80-column card format and receive data in line or card format. UN1004/RSX supports one synchronous communications circuit to a host computer, a single switched or dedicated leased line, a two-wire or four-wire common carrier facility at transmission rates of up to 4,800 bits per inch, and ASCII line communications code. Only full-duplex console terminals can act as emulator terminals.

MUX200 Multiterminal Emulator

MUX200/RSX-1AS provides communication with a CDC 6000 CYBER series or other system using the 200 UT Mode 4A communications protocol. The PDP-11 user can communicate at command level with a host system, submitting jobs for batch processing and receiving results from the host. The software package can be configured to support either ASCII or external BCD versions of the communications protocol.

MUX200/RSX-1AS enables several users to communicate simultaneously with a host system over a single line. The PDP-11 system, while using a single physical drop, appears to the host as a number of multidrops and terminals on the circuit.

Operating System	IBM 2780	IBM 3780	IBM HASP	IBM 3271	IBM SNA	UNIVAC	CDC MUX-200
RT-11	10.16.xx	10.16.xx					
CTS-300	10.16.xx	10.16.xx					
RSX-11M	10.1.xx	10.1.xx	10.51.xx	10.88.xx	14.4.xx	10.79.xx (UN1004)	10.77.xx
RSX-11M-PLUS	10.1.xx	10.1.xx	10.48.xx	10.88.xx			10.77.xx
RSTS/E ¹	10.49.xx	10.49.xx		10.38.xx			
VAX	27.7.xx	25.7.xx		25.21.xx	30.15.xx	25.68.xx (NTR)	15.2.xx
TOPS-10	30.23.xx 30.24.xx	30.23.xx 30.24.xx	30.24.xx				
TOPS-20	30.23.xx 30.24.xx	30.23.xx 30.24.xx	30.24.xx				

¹Not available for use with PDP-11/23-PLUS systems.

Communication costs are usually not a major concern when the network's computers are located at the same site. However, moving data between different facilities, cities or countries can become costly. Leased lines can be expensive, and not all organizations have sufficient data communications traffic to warrant leased-line costs. Dial-up lines are cost-effective for low volumes of data transfer, but with moderate data volume they can also become expensive. Public packet-switched networks (PPSNs) can provide the best features of both methods.

PPSN Features

- Subscribers are permanently attached to the system by leased line.
- The network guarantees a high level of end-to-end reliability.
- The network can compensate for differences in transmission speeds between computers and terminals.
- The subscriber pays for the amount of data transmitted, not for the line itself.
- Data packets from different users are interleaved by the network, allowing for more efficient use of the PPSN line.
- Data packets can be routed along the first free line that becomes available. It is possible for subcomponents of a message to be routed along different lines.

X.25 Protocol Interface

X.25 is rapidly becoming an accepted international telecommunications protocol, as it is adopted by more and more computer manufacturers. Any system on the network can send data to any other system on the network. The PPSN provides dynamic routing and ensures data integrity.

Digital's PSI products support both the basic multivendor functional transfer of data and a higher level of support for use between Digital systems across the network. Digital's PSI products have been designed and built to conform to the June 1980 CCITT LAPB specification. Programs can exchange data with other programs, and connections can be made over Permanent Virtual Circuits (PVCs) or Switched Virtual Circuits (SVCs).

Digital's PSI products support access by remote terminals according to CCITT recommendations X.3 and X.28 through a network-supplied Packet Assembler/Disassembler (PAD) to the RSX-11 system. Remote-terminal users have the same access privileges to RSX-11 programs as they would if they were local. Thus it is possible to run application programs across a network without modification, unless the network itself imposes restrictions that are beyond Digital's control.

The PPSN guarantees data integrity across the network. In addition, Digital's PSI products provide a subset of the Digital Network Architecture (DNA) specified Network Management functions. Network control programs are provided for loading and unloading the software, for defining the lines and network to which the system is connected, and for display of various network information, i.e., error counters and numbers of packets received and transmitted.

Use of RSX-11 PSI with DECnet-11M and DECnet-11M-PLUS allows packet-switched connections to be used as replacements for traditional leased or dial-up circuits in a portion of, or in all of, a DECnet network.

RSX-11 PSI

RSX-11 PSI/M and RSX-11 PSI/M-PLUS allow suitably configured RSX-11M and RSX-11M-PLUS systems to connect to public packet-switched networks (PPSNs) that conform to the CCITT recommendation of June 1980. These PSI products support both task-to-task communication via the network and remote terminal communication through a packet assembler/disassembler (PAD) facility provided by the network. Terminals connected to a host RSX-11M or RSX-11M-PLUS system cannot act as network terminals to other systems connected to the network.

Access to RSX-11 PSI/M or RSX-11 PSI/M-PLUS is supported for RSX-11M user programs written in MACRO-11, FORTRAN-IV, and FORTRAN-77. The communications discipline used is the CCITT V.24 (RS232-C) at the hardware level, the symmetric LAPB variant of the X.25 frame-level protocol and the X.25 packet-level protocol.

RSX-11 PSI/M and RSX-11 PSI/M-PLUS can coexist with or operate as a layered product under DECnet-11M or DECnet-11M-PLUS, allowing the use of DECnet facilities over PPSNs as well as private leased lines or switched telephone networks. The Packetnet System Interface supports a subset of Digital's Network Architecture's management features, including loading and unloading software, defining lines, and providing access to error counters and other maintenance functions.

PSI products have been certified and are warranted on these networks:

Data System	RSX-11 PSI	VAX-11 PSI	TOPS-20 PSI
	10.42.xx 10.43.xx	25.40.xx	21.22.xx
TELENET (U.S.)	✓	✓	✓
TYMNET (U.S.)		✓	
TRANSPAC (France)	✓	✓	✓
DATEX-P (Germany)	✓	✓	✓
PSS (U.K.)	✓	✓	
DATAPAC (Canada)	✓	✓	
DATANET 1 (Holland)	✓	✓	
TELEPAC (Switzerland)		✓	

Additional Information

- Digital's PDP-11 networking software order code suffixes are:
 - HD indicates 800 b/in, 9-track magtape and documentation
 - HM indicates 1600 b/in, 9-track magtape and documentation
 - HH indicates RL02 disk cartridge and documentation
 - HG indicates TU58 cartridge tape and documentation
 - UZ indicates single-use license and warranty only
 - GZ indicates documentation-only kit

Consult the *Software Product Descriptions* for more information on each product. The level of functionality for a group of communications software varies depending on the operating system.

Communications Software		Order Code (SPD Number)			
		RSTS/E	RSX-11M	RSX-11M-PLUS	RT-11
MUX200/RSX-11S Multiterminal Emulator	–		QJ070-xx (10.77.xx)	QJ077-xx (10.77.xx)	–
RSX-11M/IAS RJE/HASP	–		QJS60-xx (10.51.xx)	QJS62-xx (10.48.xx)	–
RSX-11M/SNA Protocol Emulator	–		QJD69-xx (14.4.xx)	–	–
RSX-11 PSI	–		QJD91-xx (10.42.xx)	QJD92-xx (10.43.xx)	–
UN1004 RSX/UNIVAC 1004 Terminal Emulator	–		QJ170-xx (10.79.xx)	–	–
2780/3780 Protocol Emulators		QRD06-xx (10.49.xx)	QJD82-xx (10.1.xx)	QJD82-xx (10.1.xx)	QJD59-xx (10.16.xx)
3271 Protocol Emulators		QRD05-xx (10.83.xx)	QJD76-xx (10.88.xx)	QJD84-xx (10.88.xx)	–

...the ...

The American people are entitled
 to know the truth about the
 activities of the American
 government in China.

This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some faint smudges and discoloration, characteristic of old paper. The left edge of the page is bound, and the overall tone is a warm, off-white or light beige.

(The following text is extremely faint and largely illegible due to low contrast and blurring. It appears to be a list or index of items.)

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This image shows a blank, aged, cream-colored page, likely an endpaper or flyleaf of a book. The paper has a slightly textured appearance with some faint smudges and discoloration, characteristic of old paper. The left edge of the page is bound, and the overall tone is a warm, off-white or light beige.

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This image shows a completely blank white rectangular area, which appears to be a scan of a physical document. The white space is uniform and devoid of any markings, text, or illustrations. It is enclosed within a prominent, solid black border that frames the entire composition. The overall appearance is that of a clean, empty sheet of paper captured against a dark background.

Software Services are available to support Digital's system customers during any aspect of their system analysis, software development, or implementation efforts. These services available start with the personal attention of a Digital software consultant and continue for as long as the customer owns the system.

A software specialist often works with a Digital sales representative to evaluate a prospective user's needs prior to purchase, recommend hardware/software solutions to problems, and give advice on the feasibility and costs of proposed solutions.

Software Services support assures that purchased software products conform to Digital's Software Product Descriptions. Ongoing software support is assured through a variety of Software Product Services which offer customers the opportunity to keep their software up-to-date and running smoothly. A full range of Professional Software Services is available to assist customers throughout the planning, implementation, and production phases of their systems.

For those customers that require Digital installation, software specialists are available to install the software and verify that the system is complete. Software performance Reports are used to report non-conformance problems with the software products.

Software Product Services

Software Product Services (SPS) provide informational, preventive and remedial service to help customers during and after the installation. These services provide updates to the latest software products, responses to reported software problems, and technical publications that contain programming notes and documentation corrections.

Software Product Services includes two families of service: OPTIMUM Startup Service, and Service Agreements.

OPTIMUM Startup Services

Software Product Services offers, (1) comprehensive system startup service packages covering the operating system and all dependent products on the system, (2) DECstart packages, and (3) one Installation-Only Service package.

Each service package provides one year of service for the operating system and dependent software plus training which is available immediately upon purchase of the package. SPS will also service, during the unexpired term of the agreement, any additional dependent Digital Software Products purchased for the system. There is no charge for media and documentation when purchased with the packages.

Level Three

OPTIMUM 3 – Level 3 is ideal when around-the-clock software support is important to the daily operation. Level 3 provides:

- DECsupport Service for Software
- Media and Documentation for the operating system and dependent software
- Installation and DECstart 3
- Training Level 3

Level Two

OPTIMUM 2 – Level 2 is ideal when the technical staff can offer only limited support, and uninterrupted operation is necessary. Level 2 provides:

- DECsupport Service for Software
- Media and Documentation for the operating system and all dependent Digital software products
- Installation and DECstart 2
- Training Level 2

Level One

OPTIMUM 1 – Level 1 is ideal where the technical staff has the skill to install, operate, and support the new system using Basic Service for Software to maintain the software at its most current level. Level 1 provides:

- Basic Service for Software
- Media and Documentation for the Operating system and all dependent Digital software products
- Training Level 1

Installation Only – There is no additional charge for products installed with the original *OPTIMUM* System Startup Service. However, there are those instances when there is no need to purchase a System Startup Service or there is a need to have dependent product installed at a date not concurrent with the initial installation. The purchase of installation only as a separate service is appropriate in these instances.

DECstart Services

DECstart is a proven combination of direct assistance, documentation review, discussion, and hands-on experience provided on-site by a Digital Software Specialist.

Users learn directly on their own systems and can put their knowledge to use immediately. The DECstart services are conducted over a period of time to assure mastery of the system. Programmers and system managers are taken step-by-step through the techniques required to effectively operate a particular system. DECstart enhances the ability of users to keep their systems running smoothly by teaching them how to troubleshoot problems.

Digital's Software Product Services group meets customer needs by offering a wide range of options to supplement the standard DECstart package. Optional services are priced according to the time they require, therefore an estimate can be given for any requirement a customer may be considering. In addition, a Digital Software Specialist can draw up a Customer Support Plan to help the user determine any further areas in which he or she might benefit from additional services.

Service Agreements

Software Product Services offers three levels of monthly service agreements, plus two product update services which may be purchased on an "as needed" basis.

DECsupport Service for Software – The most comprehensive software product service available. DECsupport includes all the elements of Basic Service plus preventive maintenance, delivery, installation of updates. Program Change Orders, and on-site remedial support for critical situations.

Basic Service for Software – This service is appropriate for users who require some but not total support. It includes all the elements of Self-Maintenance Service, plus telephone support for usage and remedial software questions.

Self-Maintenance Service for Software – Tools are provided to enable users to maintain their own system software. These include Software Product and Documentation Updates, sent automatically as they are released. These newsletters contain information about new software developments and enhancements, and Software Performance Reports, a formal software problem reporting mechanism.

Software Product Updates – These are single major release of software including documentation. No services are included, however, they may be purchased at per-call rates. Software Product Updates are generally purchased by customers who have a Self-Maintenance Service for Software agreement when they wish to update their system to its latest version.

Service Rights-to-Copy – This option allows customers to copy Software Product Updates onto a single, additional CPU. It is suitable for customers who are running identical operating system software on several similar CPUs and who want to copy the updates only.

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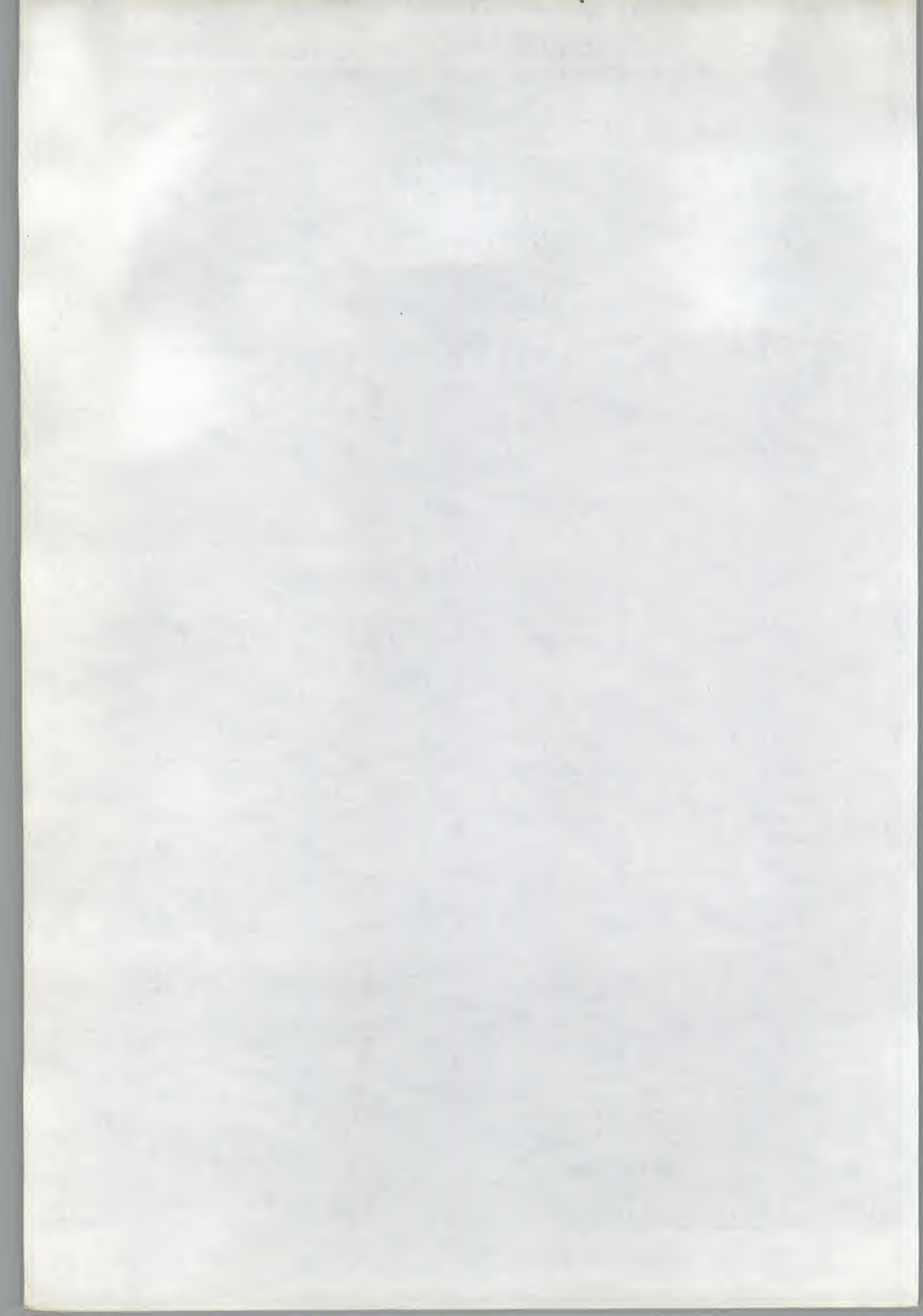
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